Fig. PA1: MAGNET-Automated Contracting System

```
┌─────────────────────┐
│   Buyer formulates  │
│        plan         │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│    Buyer looks      │
│    up suppliers     │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│  Buyer sends RFQ    │
│ with time constraint│
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│      Buyer          │
│   evaluates bids    │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│      Buyer          │
│   accepts one bid   │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│      Buyer          │
│  receives deliveries│
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│      Buyer          │
│   makes payment     │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│   Close session     │
└─────────────────────┘
```
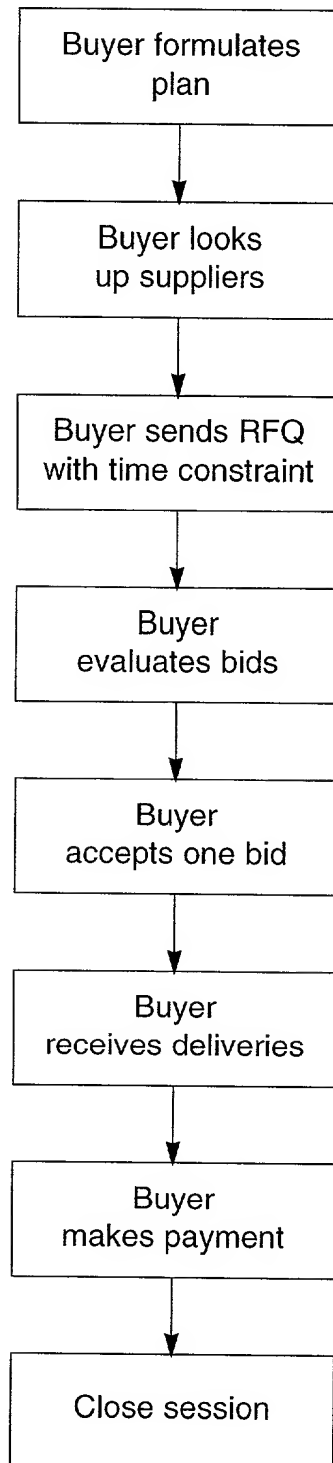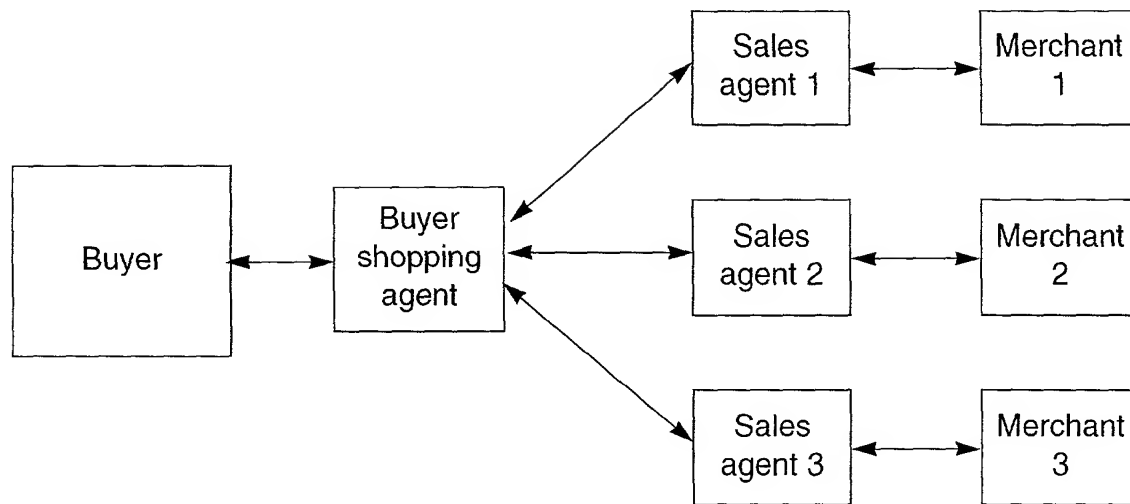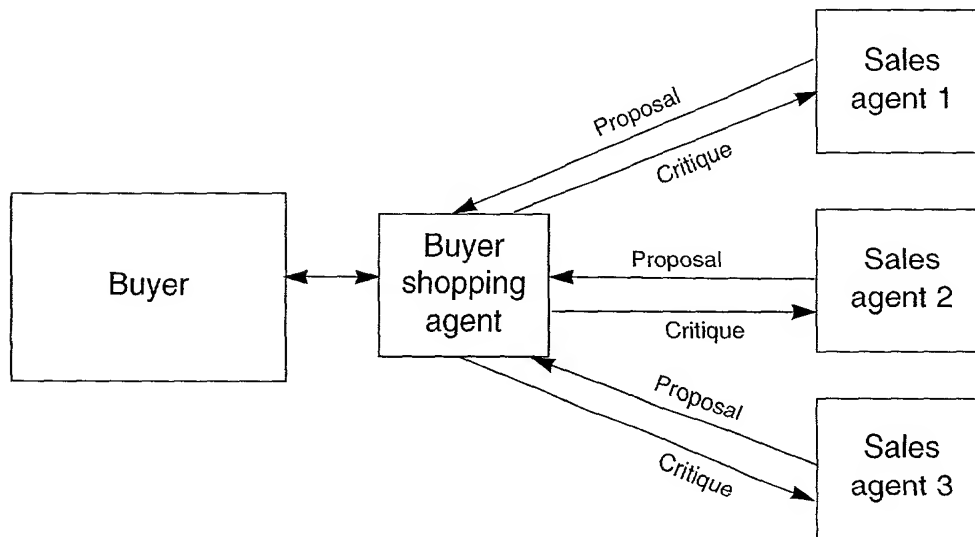
Fig. PA2: Fishmarket
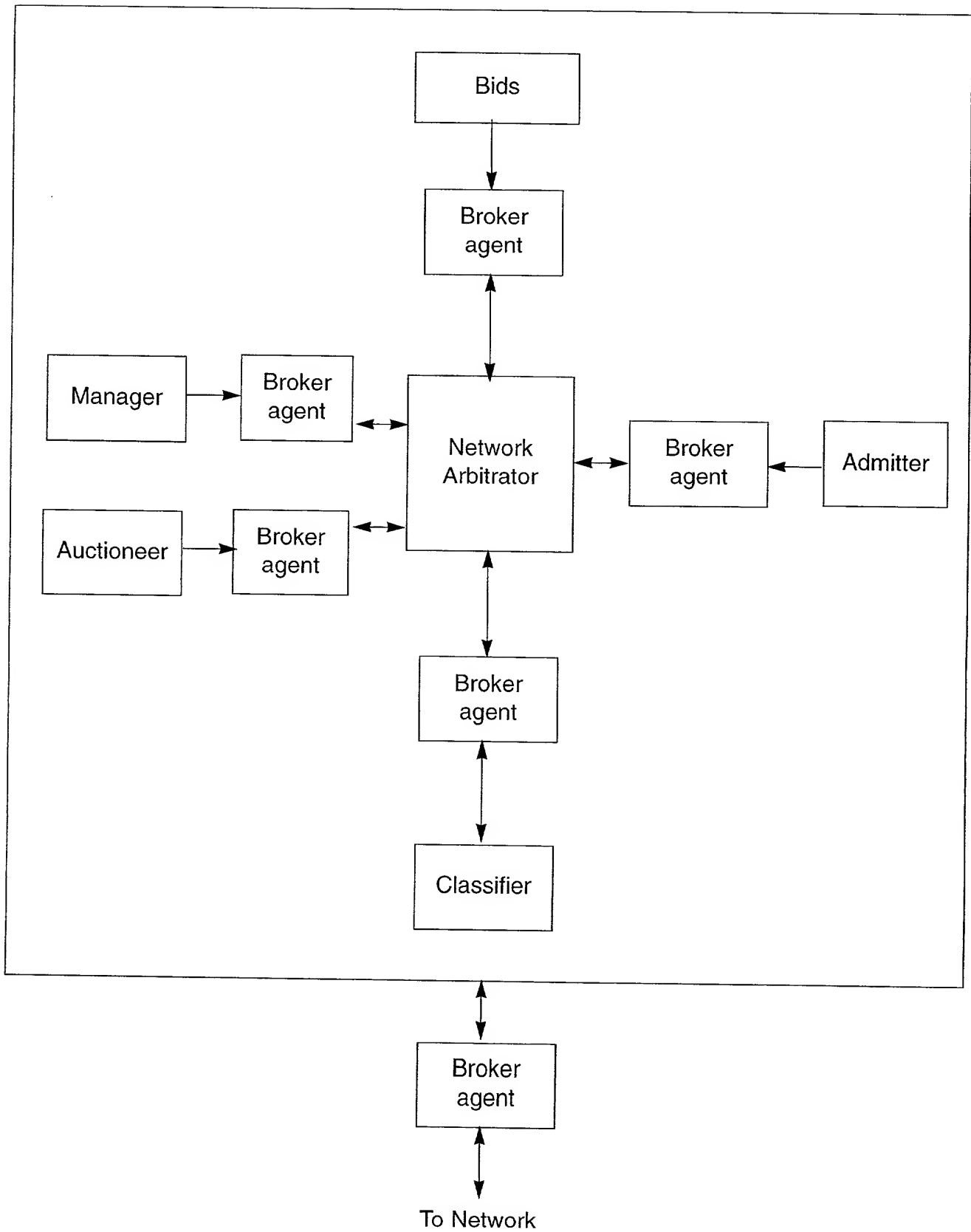
Fig. PA3: Kasbah Marketplace

Marketplace

Sellers

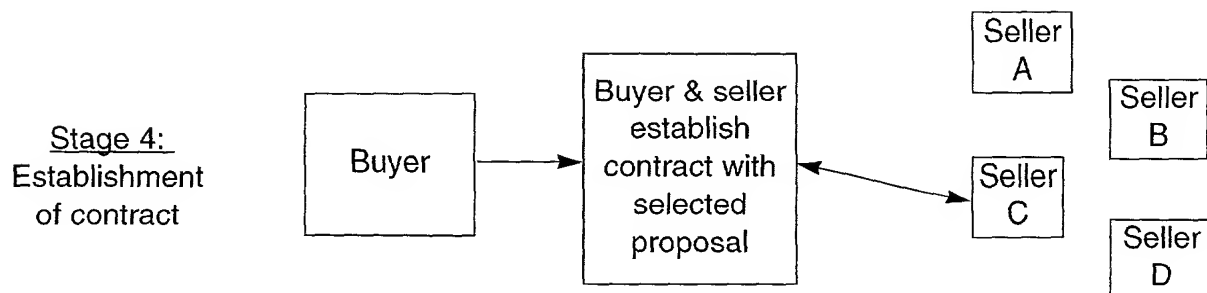Buyers

Function

of

"matching"
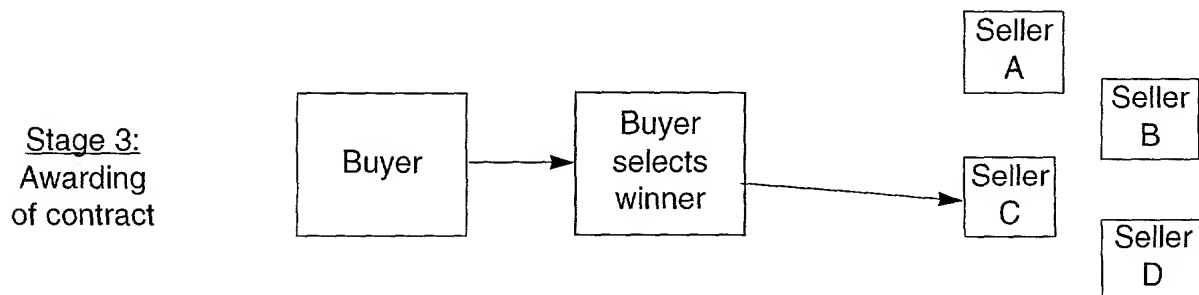
of

interests

(State
interests)

(State
interests)
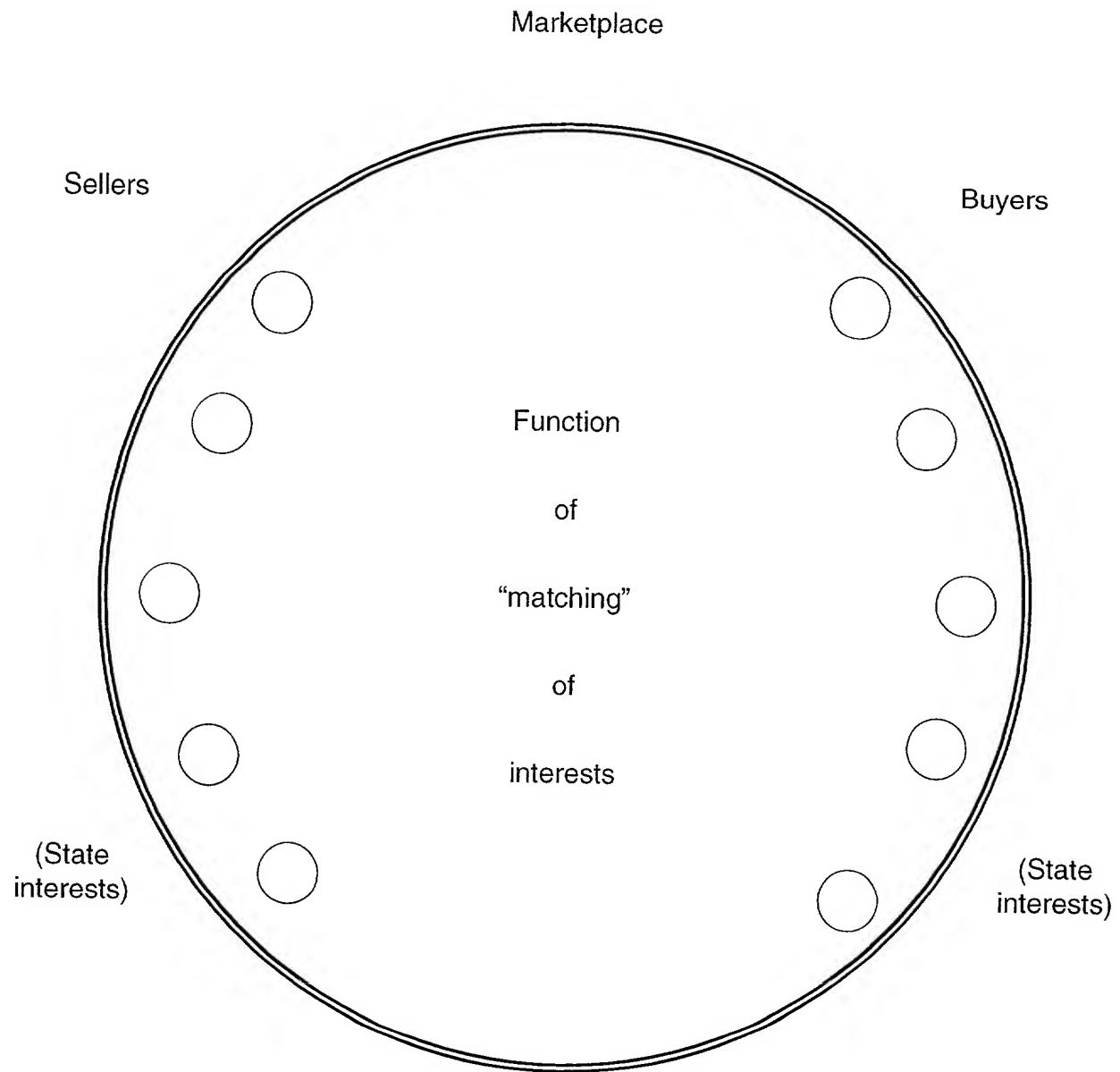
Fig. PA4A: Tete-a-tete (I): Integrative Negotiation

Fig. PA4B: Tete-a-tete (II): Bilateral Negotiation

Fig. PA5: Contract Net–4 Stages of the Contract Net

Stage 1:
Request for
tenders

Buyer → Request for tenders → Seller A, Seller B, Seller C, Seller D

Stage 2:
Submission
of proposals

Buyer → Sellers provide proposals ← Seller A, Seller C, Seller D; Seller B

Stage 3:
Awarding
of contract

Buyer → Buyer selects winner → Seller C; Seller A, Seller B, Seller D

Stage 4:
Establishment
of contract

Buyer → Buyer & seller establish contract with selected proposal ← Seller C; Seller A, Seller B, Seller D

Fig. PA6: Flow Chart Of Contract Net Protocol

Fig. PA7A: EDI As A Paper Replacement Technique

```
Point of          EDI order
sale              sent                                          ┐
                                                                │
 │ ╲          ╱                                                 │
 │  ╲        ╱                                                  │
 ▼   ╲      ╱                                                   ▼
Payment ◄── Payment ◄── Inventory ◄── Order sent        Seller
authorized  authority   credited     for ship-
            requested                ment

Buyer                    EDI
                         Invoice  ◄──────────────────

        ◄────────────
                                                ──────►

Accounts                 Payment
payable                  sent
```
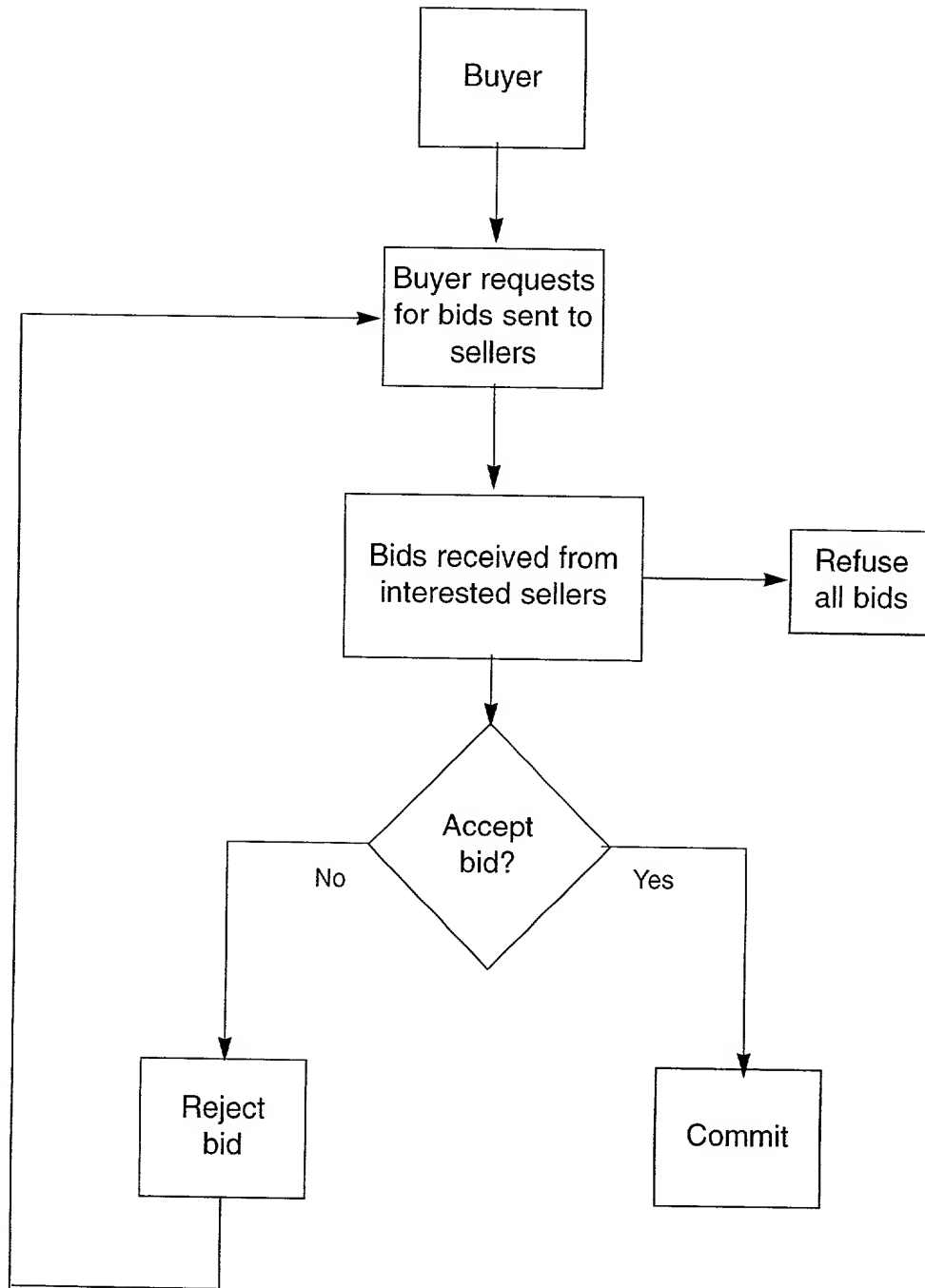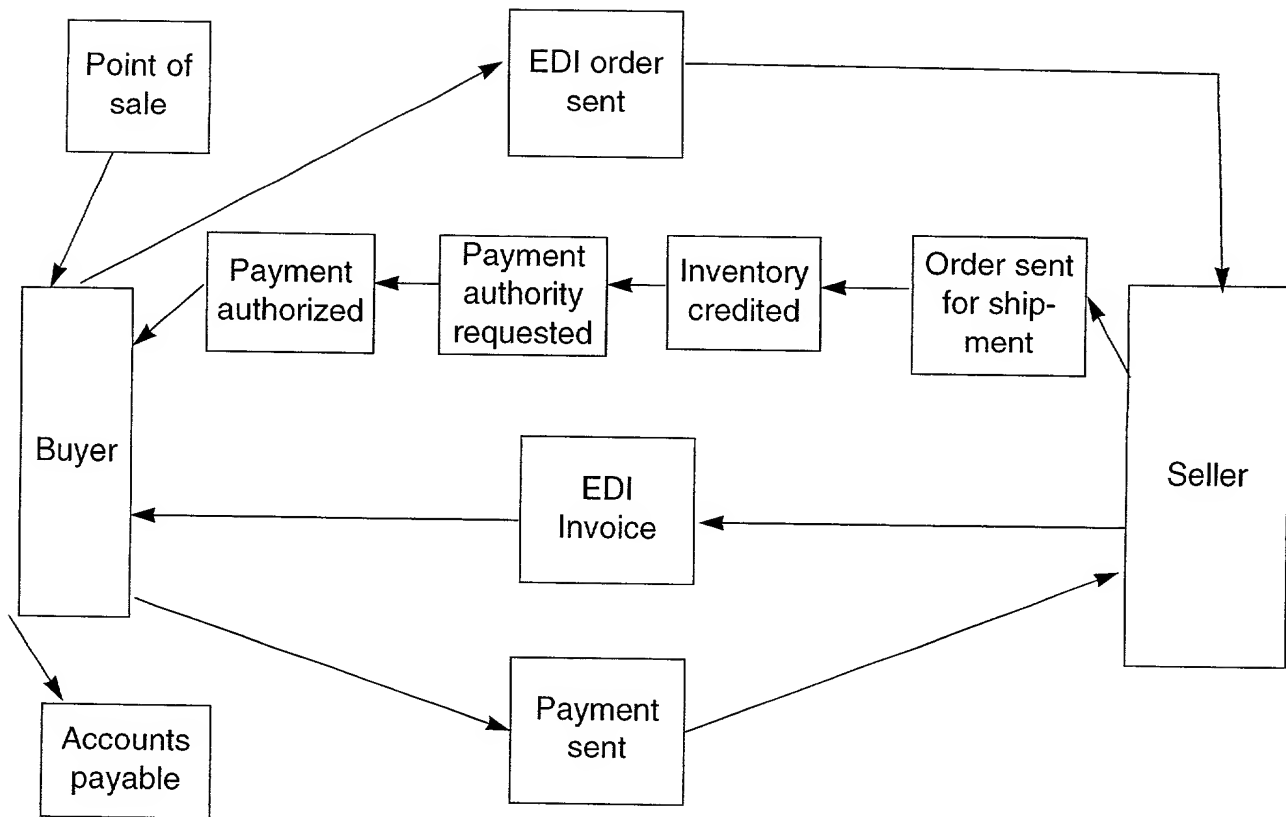
Fig. PA7B: EDI As A Process Elimination Technique

```
                      Remit
                      advice

                      Advance ship
           ◄─────     notice        ◄─────

Buyer                                               Seller

        ──►  Advance    ──►  Receiving  ◄──  Goods
             ship notice                    shipped

        ──►  Payment    ──►  Bank  ──►  Payment
             order
```
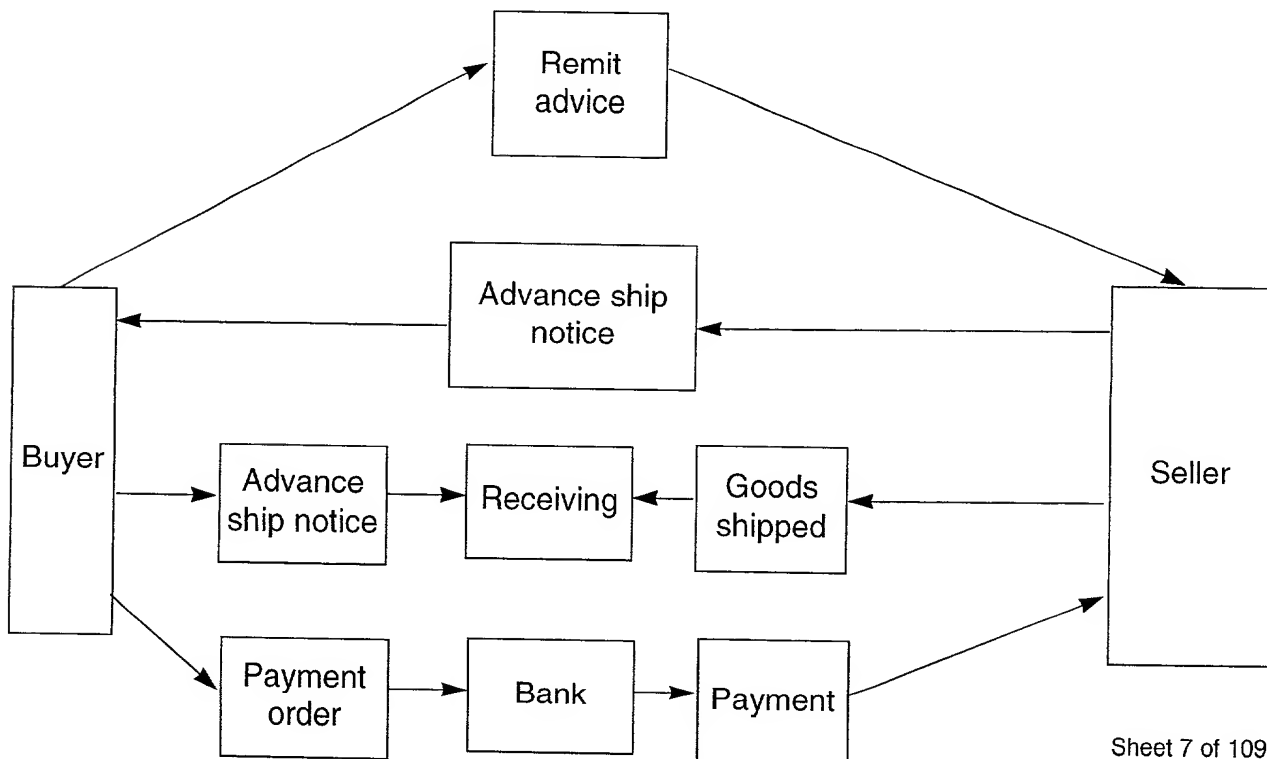
Fig. PA8: ECN (Electronic Communications Network)

Distinct data sources

A B C D

Data is "pushed"

Real-time stock execution

Central database

Multivariable analysis

Trades are executed on price only

A B C D
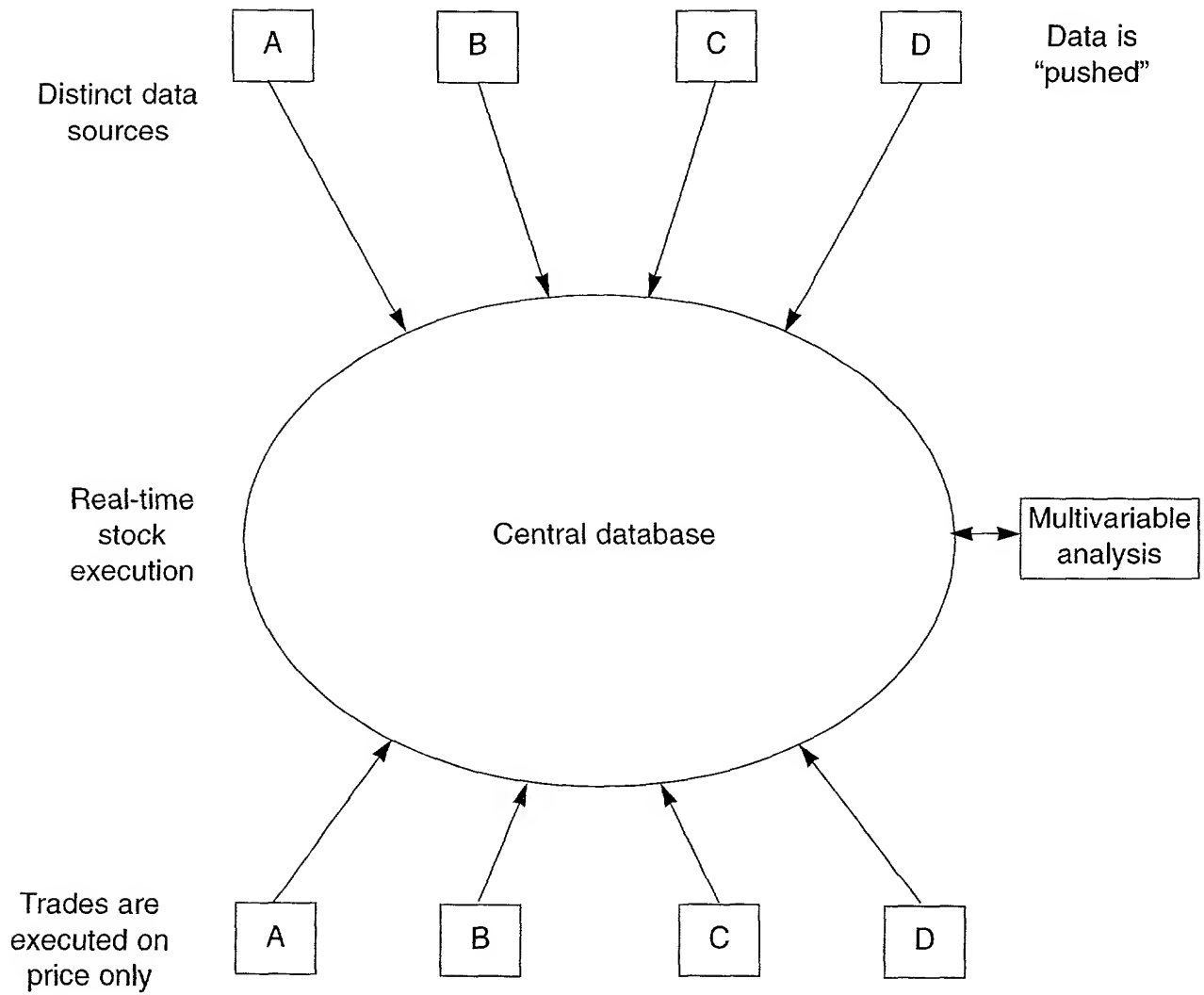
Fig. PA9A: Intermediated Demand-Initiated Procurement System

I. Specific Service Selected (1,2,3)

II. Specific Equipment Selected (5,6)

III. Application Bundles Selected (4a,c)

IV. Service Bundles Selected (1,2,3,4b))

Enter Service Features

Enter Equipment Features

Enter Application Services Features

Enter Service Features

(3x)

Select at least 4 vendors from appropriate list of choices

System sends bid requests to at least 4 vendors

X M L/UDDI

Send bid request

Send bid request

Send bid request

Send bid request

X M L/UDDI

System receives bids: Software agents interact with vendor databases (may be manually overridden) or establish real time connection to vendors' databases

(3y)

Present bids in spreadsheet comparison chart

From

Reject all
Choose different vendors

Customer narrows down to at least 2 vendors

Yes

Fig. PA9B: Continued

Customer counters on basis of different features, pricing or quality

Yes → Present new requests to 2 vendors

No →

3z → Customer narrows selection to 1 vendor

Vendors
- 2 Vendors bid
- 1 or 2 vendors bid → 1 vendor bids

Vendor(s) bid

Customer Chooses 1 Vendor
- Yes →
- No →

Customer counters?
- Yes → Present counter bid to 1 vendor
- No →

Present counter bid to 1 vendor → Vendor counters?
- Counters →
- Declines →
- Accepts →

Customer confirms bid?
- No →
- Yes →

New Bids/Vendors?
- 3y Spreadsheet of bids ←
- 3x Chose new vendors →

Customer modifies request?
- Yes → 2. Information Module
- No → Save bid for later retrieval

Note: At any time, customer may go back a step or two instead of to the top

4. Transaction Processing
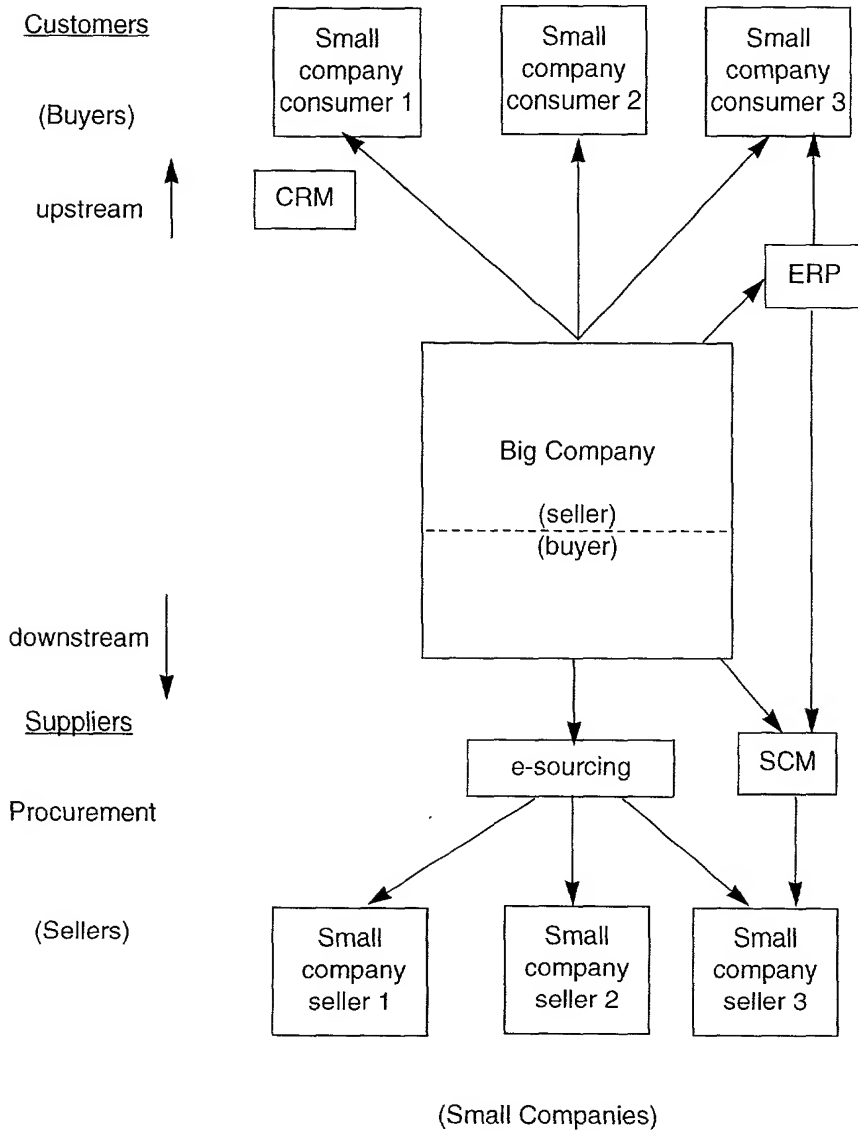
Fig. PA10: Traditional Supply Chain & Customer Relationships

(Small Company Consumers)

Customers

(Buyers)

upstream

downstream

Suppliers

Procurement

(Sellers)

Small company consumer 1

Small company consumer 2

Small company consumer 3

CRM

ERP

Big Company

(seller)
(buyer)

e-sourcing

SCM

Small company seller 1

Small company seller 2

Small company seller 3

(Small Companies)

Fig. PA11: Traditional Search Technology

Query

Spider

Spider

Central database:
Organized by keyword
and category

Spider

Spider

Result of query in
order of priority

Fig. PA12: Distributed Search Approach

Database 1	Database 2	Database 3	Database 4

First search query sent to set of distributed database

Search results evaluated by weighted criteria

Search results displayed in ranked order

Fig. PA13: Traditional Aggregation

```
┌─────────────────────────┐
│   Plurality of customers │
│   select specific product│
└─────────────────────────┘
              │
              ▼
┌─────────────────────────┐
│  Vendor provides better  │
│  unit price based on     │
│  increased number of     │
│  customers in specific   │
│  time frame              │
└─────────────────────────┘
              │
              ▼
┌─────────────────────────┐
│  At end of term,         │
│  customers accept        │
│  product price           │
└─────────────────────────┘
              │
              ▼
        ┌──────────────┐
        │ Transaction  │
        │ Processing   │
        └──────────────┘
```

Fig. PA14: Intermediated Option Contracts

Customer selects item at
offer price & time deadline

Vendor waits
for better price if
before present
deadline

Vendor sells item to another
buyer at a higher price than orig-
inally agreed with first customer
by original deadline

Vendor sells item to original
buyer at agreed price

Vendor gives original cus-
tomer a pre-agreed fee as
penalty for not selling item
at original price by the
deadline

Transaction processing

Fig. 1: CCN Architecture

Corporate Data Inputs

Market Data Inputs

Main Corporate Databases
DB1   DB2
Firewall

1005

1010

Seller-AA   Buyer-AA

1013

1025

Set Parameters

1020

Promotion & RMO modules

1015

S-IAs

1030

Customer GUI

1035

Collabo-ation

1040

Buyer Inter-agent

1050

S-IAs

1055

Pre-negotia-tion

1045

Data as objects/codes

Seller Site Showcases

SC1   SC2

1060

Commercial Search Agent (CSA)

1065

Price, negotiation & auction modules

1080

1085

1070

Price, negotia-tion & auction modules

1090

S-INA 1

S-AA

S-INA 2

B-INA 1

B-AA

B-INA 2

1075

1095

1100

S-ITA

B-ITA

1105

1110

End Transaction

1115

Sheet 16 of 109

Fig. 2: CCN System Layers

1 Front-end

2 Show-case

3 Analytics

4 Inter-Agency

5 Search

6 Nego-tiation

7 Trans-action

1116 — Corp. data-bases

1118 — Customer GUI

1120 — Showcase databases

S-AA 1122

RMO's 1124

1126 B-AA

Promo-tions 1128

S-IA 1130

Collaboration 1132

B-IA 1134

CSA 1136

S-INA 1138

S-C-INA 1140

1142 D-INA

B-C-INA 1144

B-INA 1146

S-ITA 1148

1150 B-ITA

Fig. 3: Showcase Database System

Fig. 4: Multiple Vertical Databases

1255

1260

Showcase Showcase

Showcase Showcase

Specific Industry A

Showcase Showcase

Showcase Showcase

Specific Industry B

Showcase Showcase

Showcase Showcase

Specific Industry C

Showcase Showcase

Showcase Showcase

Specific Industry D

Fig. 5: Showcase Database View

Fig. 6: Showcase Database Operation

Fig. 7: Showcase Data Flow

1355
S-IA receives data sets from corporate database and from S-AA

1357
S-IA filters data by analyzing optimal data to be included in showcase database

1360
Data is imported from S-IA to showcase

1362
S-IA continually updates showcase by inputting new data and purging old data

1365
Real time data sets in showcase as always current

Fig. 8: Inter-agent System Architecture

Fig. 9: Rivers of Data Flows

a   b   c   n

Market Data

continuous information updates

1420 Corporate database

1430 S-AA

1435 S-Inter-agent

1440 Promotion & RMO module

1425

continuous information updates

1445 Showcase

1450 B-GUI

1452 CSA

1454 B-Inter-agent

1456 Market data

1458 Negotiation sessions at various locations

1430 S-AA

1462 B-AA

1464 AI module

1466 AI module

1468 S-ITA

1470 B-ITA

1472 End session

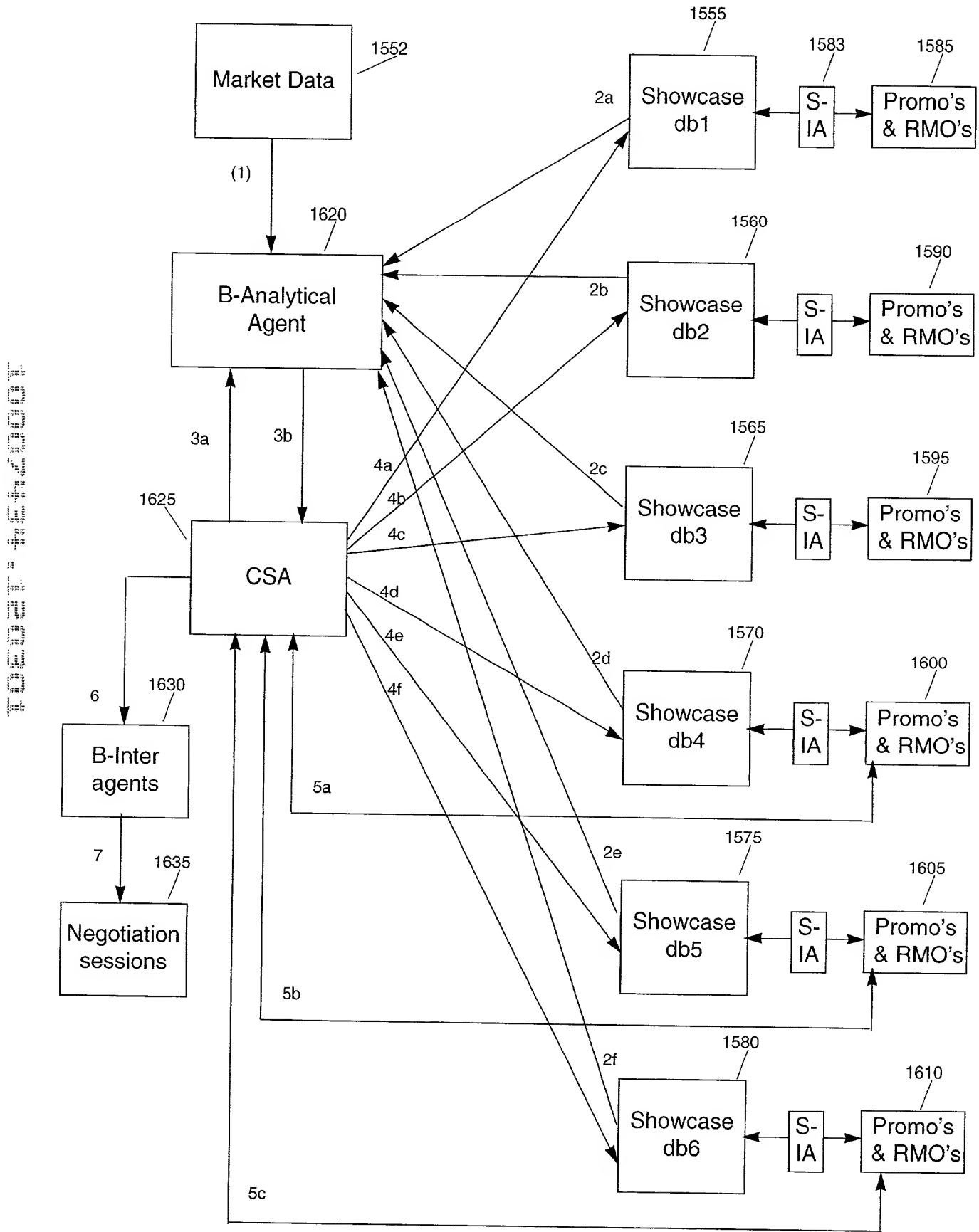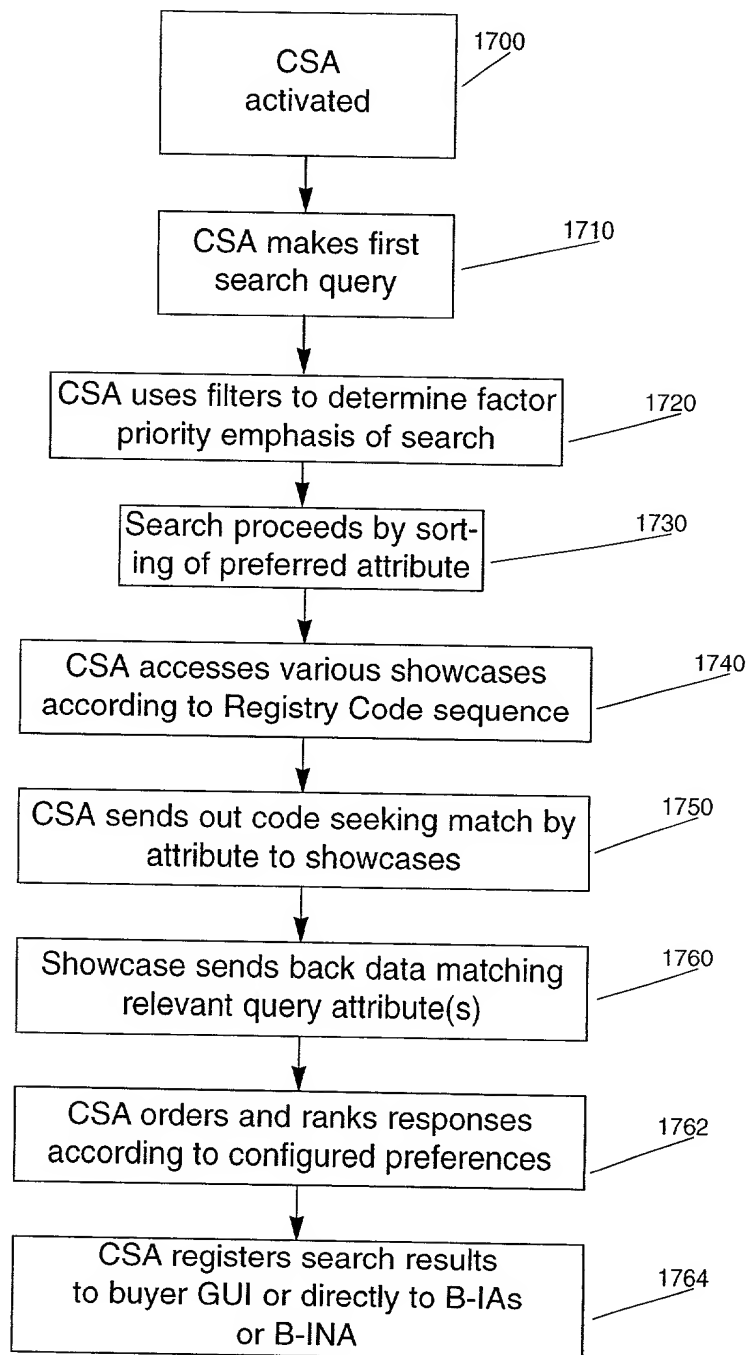# Fig. 10: CSA System Architecture

Fig. 11: CSA First Query Sequence

Fig. 12: Programmability of CSAs for Priorities of Search

```
┌─────────────────────┐
│        CSA          │  1700
│     activated       │
└─────────────────────┘
           │
           ▼
┌─────────────────────┐
│  CSA makes first    │  1710
│   search query      │
└─────────────────────┘
           │
           ▼
┌───────────────────────────┐
│ CSA uses filters to determine factor │  1720
│  priority emphasis of search │
└───────────────────────────┘
           │
           ▼
┌─────────────────────────┐
│ Search proceeds by sort- │  1730
│ ing of preferred attribute │
└─────────────────────────┘
           │
           ▼
┌───────────────────────────┐
│ CSA accesses various showcases │  1740
│ according to Registry Code sequence │
└───────────────────────────┘
           │
           ▼
┌───────────────────────────┐
│ CSA sends out code seeking match by │  1750
│     attribute to showcases │
└───────────────────────────┘
           │
           ▼
┌───────────────────────────┐
│ Showcase sends back data matching │  1760
│   relevant query attribute(s) │
└───────────────────────────┘
           │
           ▼
┌───────────────────────────┐
│ CSA orders and ranks responses │  1762
│ according to configured preferences │
└───────────────────────────┘
           │
           ▼
┌───────────────────────────┐
│ CSA registers search results │  1764
│ to buyer GUI or directly to B-IAs │
│        or B-INA          │
└───────────────────────────┘
```

Fig. 13: CSA As Initial Search Query

```
1800 ──  B-Analytical        Commercial      1805
          agent      ◄──────► search
                             agent
                              │
                              ▼
                            First          1810
                           search
                           request
            ┌────────────────┼────────────────┐
            ▼                ▼                 ▼
1825 ──  Showcase         Showcase      Showcase  ── 1815
          1                2  ── 1820       3
            └──────┐    ┌───┘                │
                   ▼    ▼                     ▼
                  pre-            1830    Buy item  ── 1835
               negotiation                now at first
                   │           yes        price?
                   ▼          ┌────────────┤
1845 ──          B-INA        ▼            │ no
1840            ┌──┴──┐      ITA ── 1855   ▼
                ▼     ▼                    Go to      ── 1870
              S-INA 1  S-INA 2 ── 1850   negotiation
                │       │                 session
                ▼       ▼                    │
1860        Buy item   Go to   ── 1865       ▼
            now at first  negotiation    complete
  yes       price?     session          transaction
 ┌──────────┤
 ▼          │ no
ITA         ▼
 │         Go to    ── 1875
 │ 1880   negotiation
 ▼        session
complete     │
transaction  ▼
```

Sheet 28 of 109

Fig. 14: CSA Filters

1900 — **CSA**

1905 — **Promotions and invitations from vendors**

1910 — **Manually configured search agent filters according to specific factors**

- Item/bundle price range — no
- Location — no
- Item niche — no
- Availability — no
- Bundles/ packages — no
- Accountability — no
- Analysis of quantity of past experiences — no
- Accuracy enhancement to focus search results

Several simultaneous factors selected

1920 — **Micro-casting to specific cus-tomers**

1925 — **Promo's/RMO's Incentives/ discounts**

1930 — **Demand-shaping: Vendors seek to influence buyers with options and incentives**

1945 — **Discounts**

1950 — **Accelerated delivery**

1955 — **Analysis of quality of incoming data**

1965 — **Analysis of quality of incoming data**

1960 — **(Adjustable) Purification of Data**

1970 — **Several co-equal (comparable) choices generated**

1975 — **Negotiation Sessions**

Fig. 15: Promotions

Fig. 16: Proximity Marketing For Mobile INAs

2040

Location of first
INA negotiation

2042

B-INA arrives at
specific location

2044

Promotion
module

2046

S-INA accesses database via an
S-AA to ascertain if B-INA fits a
specific promotional category

No

2048

Do not
provide
promotion

Yes

2050

S-INA offers B-INA specific,
time-sensitive promotions
at a specific location

Fig. 17: Promotional Discounting

2060

Products	
Cutting Edge	Trailing Edge

2050

CSA

2070

Services	
High Peak	Low Peak

2080

Bundles	Upgrades
Increased Quantity	Time-based

Fig. 18: Dynamic Pricing Model

Conditions:
- Product cycle rate
- Market/Economy
- Competition

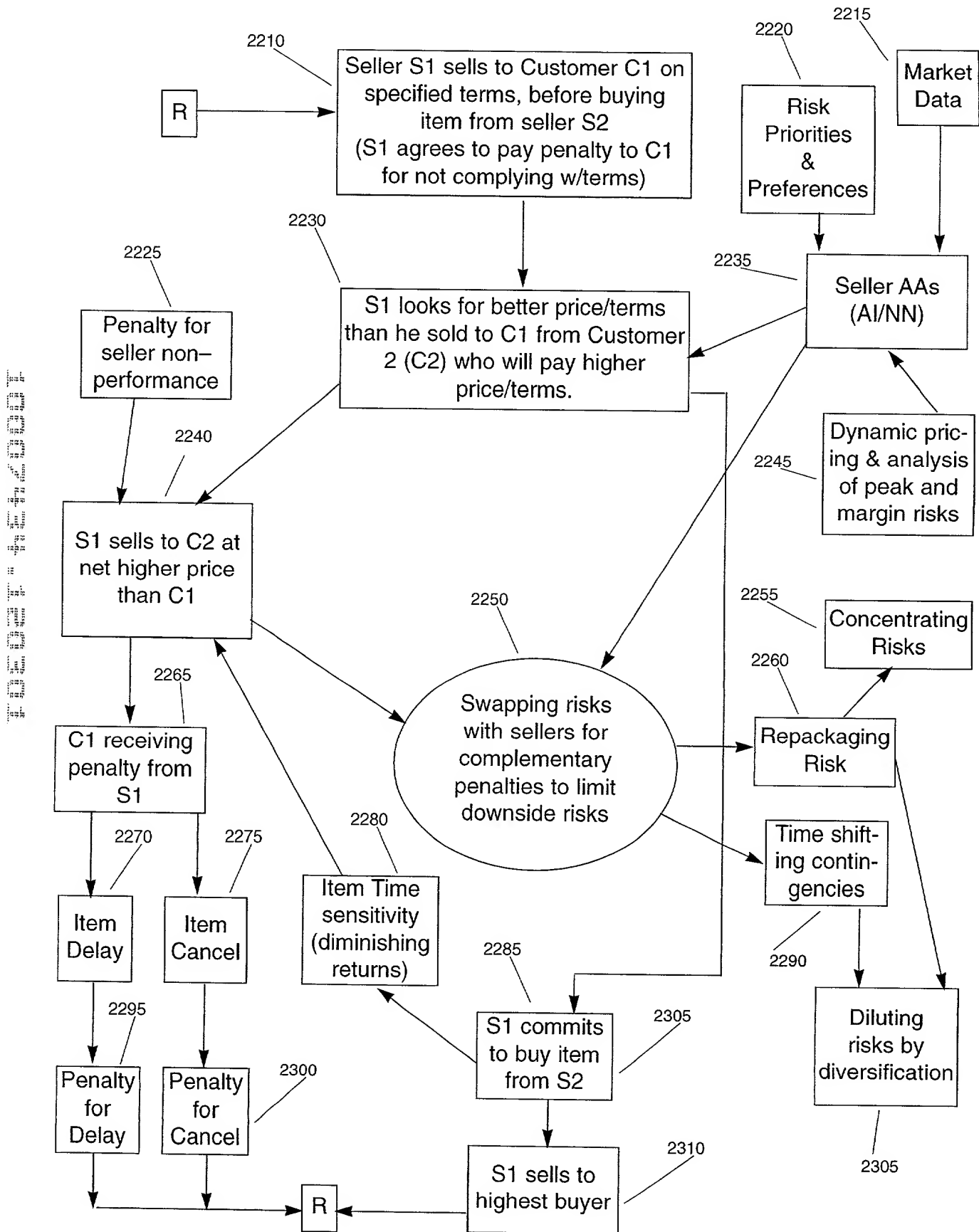Cutting
Edge

Technology Pricing

-Products & Services

Peak
Services

Trailing
Edge

Off-Peak
Services

Price —→

Time ——————→

Fig. 19: Pricing Discount Promotions

Dropping Prices Tendency

1. Trailing edge technology

2. Off-peak service

3. Bundled packages (aggregation-discounts)

4. Surplus items

5. Decreasing quality

6. Quantity discount (multiple identical items)

8. Un-time-sensitive

9. Decreased features

10. Exploding (Time-sensitive) offers

Fig. 20: Promotions Integrated with CSA & Showcase

Transaction based vs. Relationship based

2110

Advertisements

2120

Inducements

Ways to Promote

Push	Target
broadcast	custom

Invitation (by seller)	Requested (by buyer)
↓	↓
incentives	intentionality (customer seeks item)

2130 Discounts ————————————————————→ Cross-Selling

2140

Kinds of Promotions

-price
-quantity
-(bundles)
-time-based
-(upgrades)

multivariate

bundles	upgrades
increased quantity	time-based

Yield Management Services		Technological Decay Curve (Products)	
High peak	Low peak	cutting edge	trailing edge

2150

Fig. 21: RMO Contract Processes in Distributed System

2210

R →

Seller S1 sells to Customer C1 on specified terms, before buying item from seller S2 (S1 agrees to pay penalty to C1 for not complying w/terms)

2220

Risk Priorities & Preferences

2215

Market Data

2225

Penalty for seller non-performance

2230

S1 looks for better price/terms than he sold to C1 from Customer 2 (C2) who will pay higher price/terms.

2235

Seller AAs (AI/NN)

2240

S1 sells to C2 at net higher price than C1

2245

Dynamic pricing & analysis of peak and margin risks

2250

Swapping risks with sellers for complementary penalties to limit downside risks

2255

Concentrating Risks

2260

Repackaging Risk

2265

C1 receiving penalty from S1

Time shifting contingencies

2270

Item Delay

2275

Item Cancel

2280

Item Time sensitivity (diminishing returns)

2285

S1 commits to buy item from S2

2305

2290

Diluting risks by diversification

2295

Penalty for Delay

Penalty for Cancel

2300

2305

2310

S1 sells to highest buyer

Penalty for Delay → R ← S1 sells to highest buyer

R

Fig. 22: Transaction Contingencies

INA Negotiation session: simultaneous negotiation processes of one buyer and multiple sellers — 2315

Buyer delays negotiation with sellers in order to focus on negotiation with another seller — 2319

B-ITA to close details and process transaction with expression of interest — 2323

2320 — Expression of interest by buyer and one seller

Buyer and seller agree — 2324

2321 — Buyer and seller agree

Buyer contingency not performed — 2325

2326 — Seller to activate RMO contingency

Buyer withdraws with penalty — 2329

2335 — Buyer end negotiation

2331 — Buyer not qualified according to S-ITA

2327 — Seller withdraws with penalty

2333 — Seller ends negotiation

2337 — Customer goes for 2nd best item available when most preferred item is unavailable

2315 — To top

Fig. 23: Information Collaboration for MTO

2355

R

2360

B-AA

2355

R   2375

Pre-search

2365

B-IA
b-collaboration

2370

S-IA-1
s1-collaboration

S-AA

2380

Use of prior
forecasts

2385

S-IA-2
s2-collaboration

S-AA

2390

2400

CSA

before initial
search

2410

Showcase 1

2415

during
CSA

2433

B-IA
b-collaboration

S-IA-1
s1-collaboration

S-AA

2420

2435

B-AA

2430

S-IA-2
s2-collaboration

S-AA

2445

Showcase 2

2445

2450

Pre-Negotiation

after CSA

2455

B-IA
b-collaboration

2465

2460

S-IA-1
s1-collaboration

S-IA-2
s2-collaboration

2470

Negotiation
session(s)

2480

S-AA

2482

latest update
is preserved

2475

B-AA

2484

2486

Post-sale inter-b-INA
collaboration: broadcast-
ing & microcasting good
deals to friends

Close trans-
action

S-AA

2488

R

2355

Sheet 38 of 109

Fig. 24: Collaboration Process For MTO Customization

Fig. 25: INA Interaction (B-INA & S-INA Interactions)

Seller

Buyer

2518
GUI

2519
Corporate Database

2521
GUI

2523
S-Inter-agent

2525
B-Inter-agent

2530
Market data

2535
S-Analytical agent

2540
Show-cases

2545
CSA

2550
B-Analytical agent

2555
Market data

2560
Seller INA1

2565
Seller INA2

2570
Initial Search request

2575
Buyer INA

2577
Search results

2580
Pre-negotiation session [Agreement on negotiation rules]

2585
First search response

2590
Negotiation sessions between B-INA & S-INA 2, and S-INA 1 & B-INA

2595
Selection of winner by buyer

2610
Cease nego-tiations and end session

2605
S-ITA

2600
B-ITA

Fig. 26: INA Interactions - Ricochet Model

2650 — CSA

2655 — Initial search request

2660 — AA

2665 — AA

2670 — S-INA 1

2675 — Showcases

2680 — S-INA 2

2685 — B-INA buyer counter bid to S-INA1

2690 — AA

2695 — S-INA 1 seller counter offer

2700 — S-ITA1

2705 — B-INA buyer counter bid to S-INA 2

2710 — S-INA 2 seller counter offer

2715 — S-ITA2

2720 — Buyer accepts Seller accepts

2725 — B-ITA

2730 — Close

Fig. 27: Pre-Negotiation

2755 — **Customer requests terms of negotiation session**

2760 — **Buyer Interagent**

2765 — **B-INA**

2770 — **S1 first response**

2775 — **S2 first response**

....

2780 — **Sn first response**

2785 — **S(1,2, ...,n) pre-negotiate parameters of interactive session including location(s), protocols (language, translation, security, encryption, etc), double auction method, options, etc**

no

2790 — **Establish rules of negotiations & number of negotiation sessions, including options.**

2795 — **Independent multi-lateral 1-to-1 negotiation sessions between S1, S2, Sn and B-INA**

Fig. 28: Time-Based Negotiation Strategy Concealment

Seller

Buyer

2905

First ask 1

2910

First ask 2

(quickly)

2915

(slowly)

First bid for buyer

2920

First counter from seller 1

First counter from seller 2

2925

(quickly)

(slowly)

2930

First counter offer by buyer

2935

1 seller accepts

2940

(quickly)

(slowly)

Buyer accepts

Fig. 29: INA Logistics

Initiate Session
2960

Initial agent generation and ID tagging
2965

Agent interaction protocol generation
2970

Translator for various agent based inter-communications
2975

Synchronization of INAs in negotiation sessions
2980

No → Terminate
2995

AA
2985

INAs construct unique negotiation strategies using AI
2990

Agents signalling intentions to negotiate with other agents
3000

INAs send out communication streams to "home", revealing locations, status & plans
3005

S-INA 's & B-INA pre-negotiate to set rules for negotiation session
3010

B-INA launches micro-agents to negotiate with S-INAs at diff. locations
3013

INAs negotiates
3015
3020

INAs ceases negotiation
3023

B-INA & S-INA agree to complete transaction
3025

Save INA settings for later relaunch
3030

S-ITA
3035

S-ITA
3040

Close Transaction
3050

Agent's self termination
3045

Close Session
3055

Fig. 30: INA Interaction Sequence #1

3075 → Initiate initial commercial search request

3078 → Display results

3080 → Initiate pre-negotiation session(s)   No

3085 → Initiate negotiation module for specific agents

3090 → Tracking each INA (if negotiation is mobile, track activity between machines an interaction of each agent with its home)

3095 → Winner determination

3105 → B-INA activates withdrawal contingency clause to be removed from contract obligation   ← No ← 3105 → Committing to contract

Yes

3110 → Close transaction with ITAs   No

3117 → Inform AAs about transaction   ← 3115 → Save settings

3120 → Close session

Fig. 31: INA Interaction Sequence #2

Fig. 32: INA Architecture 1 (First part interactions)

3205 Corporate database
3210 Corporate database
3215 Corporate database

3220 Seller Inter-Agent1
3235 S-AA
3225 Seller Inter-Agent2
3230 Seller Inter-Agent3
3240 S-AA

3245 Showcase 1
3250 Showcase 2
3255 Showcase 3

Promotions RMO's
3265 Promotions RMO's
3260
Promotions RMO's
3275

3270 CSA

3280 Initial search request

3282 Display results

3285 Buyer INA
3290 B-AA

3295 Seller INA-1
3300 Pre-negotiation session
3305 Seller INA-3

3310 Negotiation session
3315 Select win-ner & award contract
3320 Complete transaction
3325 Disable Agent

Fig. 33: INA Architecture 2 (Negotiation interactions)

Fig. 34: INANegotiation Time Based Sequences

Buyer   Seller

3505
1st Search
request

3510
Seller
1st ask

3515
1st buyer
offer

3520
1st Seller
counter offer

3525
2nd buyer
counter offer

3530
2nd Seller
counter offer

3535
Buyer
accepts

Fig. 35: Initial INA Mobile Location Protocol Settlement

3555

Buyer
INA

3560

Seller
INA1

3565

Seller
INA2

3570

Pre-negotiation: Initial
session(s) to
determine sellers and
buyer locations
at which to negotiate

3575

Negotiate at buyer
INAlocation

Alternating Locations

3580

Negotiate at one or
more Seller
INAlocations
simultaneously

Fig. 36: Tournament Configuration of INA Winner Determination

3605 S-INA -1   3610 S-INA -2   3615 S-INA -3   3620 S-INA -3

Phase I
Need to select
two from field
of at least four

Buyer INA   3625

3630 S-INA -2   S-INA -4   3635

Phase II
Selection of
two finalists

Buyer INA   3640

Phase III
Selection of
winner

S-INA -4   3645

Fig. 37: Multivariate Negotiation

[Asks, bids and offers based on variables beyond price alone]

1st CSA search request — 3705

3710 — 1st ask by Seller INA-1

3715 — 1st ask by Seller INA-2

3720 — Seller AA checks buyer's sales history

3730 — Buyer INA1st counter-bid* to each S-INA

3725 — Seller AA checks buyer's credit & accountability

3735 — S-INA -1 1st counter offer

3740 — S-INA -2 1st counter offer

Need more negotiation to complete transaction

3745 — Buyer INA2nd counter-bid to SINA-1

3750 — Buyer INA2nd counter-bid to SINA-2

3752 — S-INA -1 2nd counter offer

3754 — Terminate

3756 — S-INA -2 2nd counter offer

no

no

yes

Need more negotiation to complete transaction

3760 — B-ITA

3762 — Buyer INA accepts S-INA -2 offer

* Counter-bids and counter offers can be based on item, quality, features, terms & other factors beyond price.

To Complete Transaction

3764 — S-ITA2

3768 — Terminate session

Close Transaction — 3766

Fig. 38: Demand-Initiated Automated Negotiation Sequence Compromise Process Within Pre-established Parameters between One Buyer & One Seller

Variable 1

Buyer   **Seller**

(2) $50   3772   3770
                                                                  $100 (1)

(4) $60   3776   3774
                                                         $90 (3)

(6) $70   3780   3778
                                                 $80 (5)

(8) $72   3784   3782
                                 $75 (7)

                             3786
[Final]-----> $73.50 (9)

Variable 2

Buyer   3792   **Seller**

(2) 2 options &   3790
    6% interest   3796   6 options & (1)
                                        3794   12% interest

(4) 2 options &
    8% interest   3800   6 options & (3)
                                    10% interest

(6) 3 options &   3798
    8% interest   3804   4 options & (5)
                            10% interest

(8) 3 options &   3802
    9% interest   4 options & (7)
                     9% interest

             3806
[Final]-----> 3 options & (9)
              9% interest

Yes ⟋ Renegotiate ⟍ No ——→ [Close]   3810
     ⟍ other terms? ⟋
3808

Fig. 39A: Negotiation in a Distributed System with Mobility

3820 — B-INA initiates negotiation session with S-INA

3822 — INAs identify location possibilities at which to negotiate

3825 — INAs specify agreed location at which to negotiate

3827 — B-INA moves to S-INA location with program code

3830 — At the S-INA location, the S-INA identifies incoming B-INA entry after activation & approving security protocol

3832 — Agents engage in negotiation task

3835 — Agents complete negotiation task

3840 — B-INA notifies its "home" computer by sending message of activities at remote location

3845 — B-INA executes more tasks at remote location? → No → 3850 → Terminate or return home → Home

Yes

3855 — B-INA assesses next task using internal database and analysis

3857 — B-INA assesses next location for task

3860 — B-INA identifies next location for task

Terminate

Fig. 39B: Negotiation in a Distributed System with Mobility (Continued)

3865 — B-INA moves to another location

3870 — Wait for agent to move its program code

3875 — B-INA identifies need for AI computation

3880 — B-INA requests AI computation resources at specified location

3885 — B-INA identifies AI computation resources available

3890 — B-INA messages to remote location request for AI computation & specifies computation resources sent to specific location

3895 — B-INA receives AI at specific negotiation site

3900 — B-INA tests sufficient AI computation resources at remote location

3905 — Complete negotiations at remote location

3910 — Agent returns home

Fig. 40: Multi-lateral Distributed Competition
(Competitive Double Shout Negotiation)

3960 — Seller INA1

3965 — Seller INA2

3970 — Buyer INA

3975 — Seller INA 4

3980 — Seller INA 3

Fig. 41: Negotiation Module: Negotiation Method Schema

1 to 1 Interactive Negotiations

Kinds Of Goals	Cooperative Goals (Zero-Sum Game)	Competitive Goals (Zero-Sum Game)
Short Term goal (price - maximization) -vs- **Long-term goal** (relationship management)	1) Exchange-based approach: Trade-off of terms/variables between parties a) matching of interests: ascertain mutual interest with overlapping sets... b) prioirtizations of preferences: hierarchy of similar priorities	1) dialectical approach: give & take of opponents until resolution a) [position description & justification] explanation based: each position advances and develops b) [Interrogation] argumentation: critique of opponent's position* c) [Ascertain mutual self-interest] Assessing overlapping interests d) Selecting common sets *Anticipate opponent's strategy

Constraining Factors

1) Time constrained: multi-sessions as instrumental changes

2) Information constrained: less than optimum information

3) Choice Constrained: Limiting of options

2) Problem-solving approach: parties seek a common solution
a) assessing common interests among different positions
b) compromise of positions to a common set shared by parties

Non-Zero-Sum Game

1) deterrence approach: behaving so that competitors do not get without higher cost
a) bidding aggressively and/or deceptively and then withdrawing

Buyer-Initiated	**Seller initiated**
[Negotiation as adjustment of seller parameters] a) buyer query as initiation b) priority of best and then second best, and then third best, etc...	[Negotiation as disagreement with initial seller promotions] a) promotions or 1st seller bid (result of search query) as 1st point of departure

Terms

1) Item terms
2) Transaction terms

Multiple Parallel Interactive Negotiations

One to several	Several to several
a) Stopping negotiation when one winner is selected	Single Item: Stopping negotiation when one buyer & 1 seller is selected Multiple items: a) Stopping negotiation when mutual agreement of multiple parties

Fig. 42: INA Auction Module-Auction Types

Auction Types

English (Increasing)	Dutch (Decreasing)
Vickrey (second highest bid)	"combinatorial" multiple-item auctions (package deals)
Combinations of auction types	Double-shout

Fig. 43: Negotiation, Pricing & Auction Module Interactions
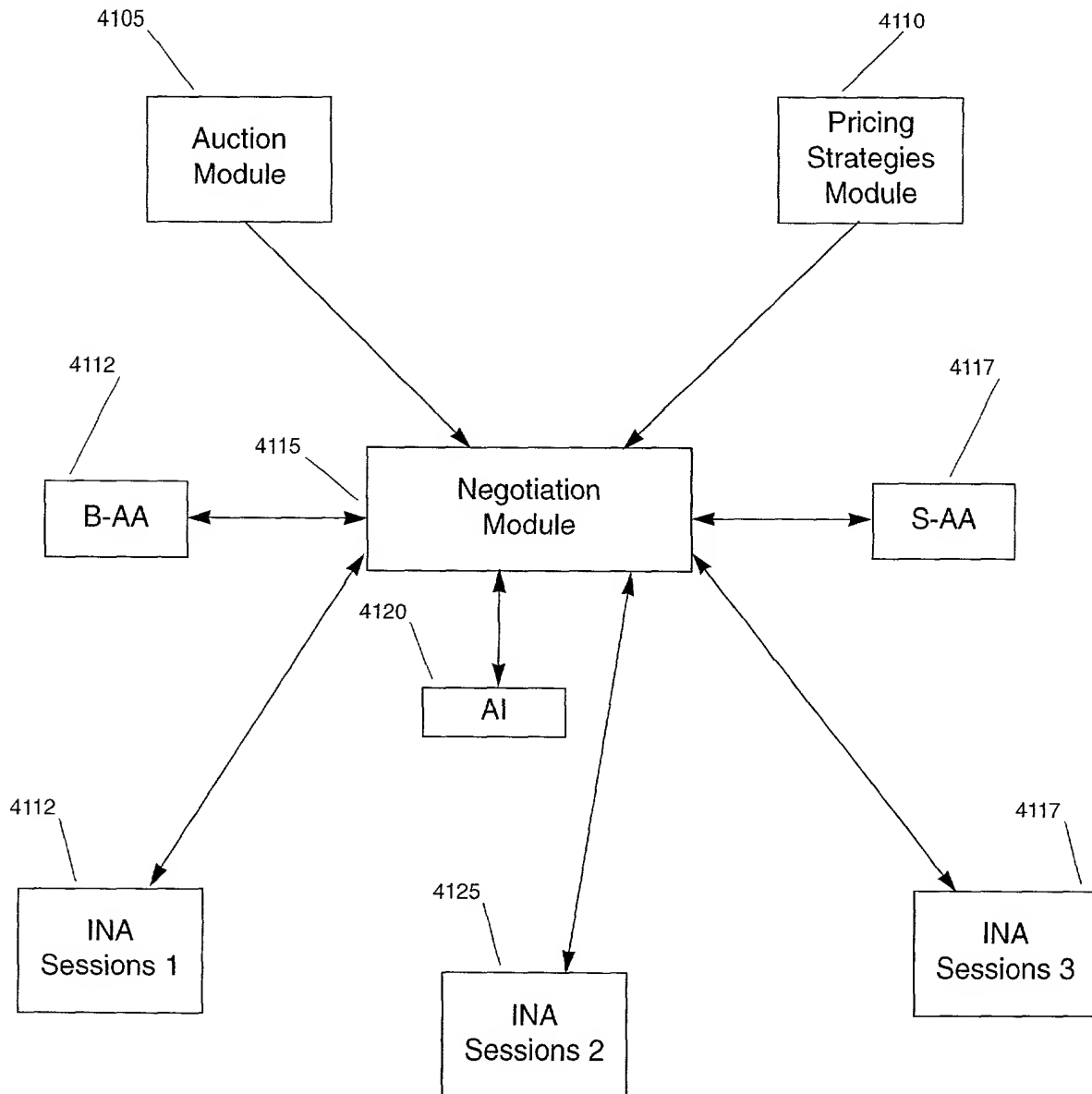
Fig. 44: Pricing Strategies Module and AA Interactions

4155

4160

Market information

Monitor com-petitor prices

4165

S-AAs

4170

AI

4175

Pricing strategies module

4163

B-AAs

4180

INA session(s)
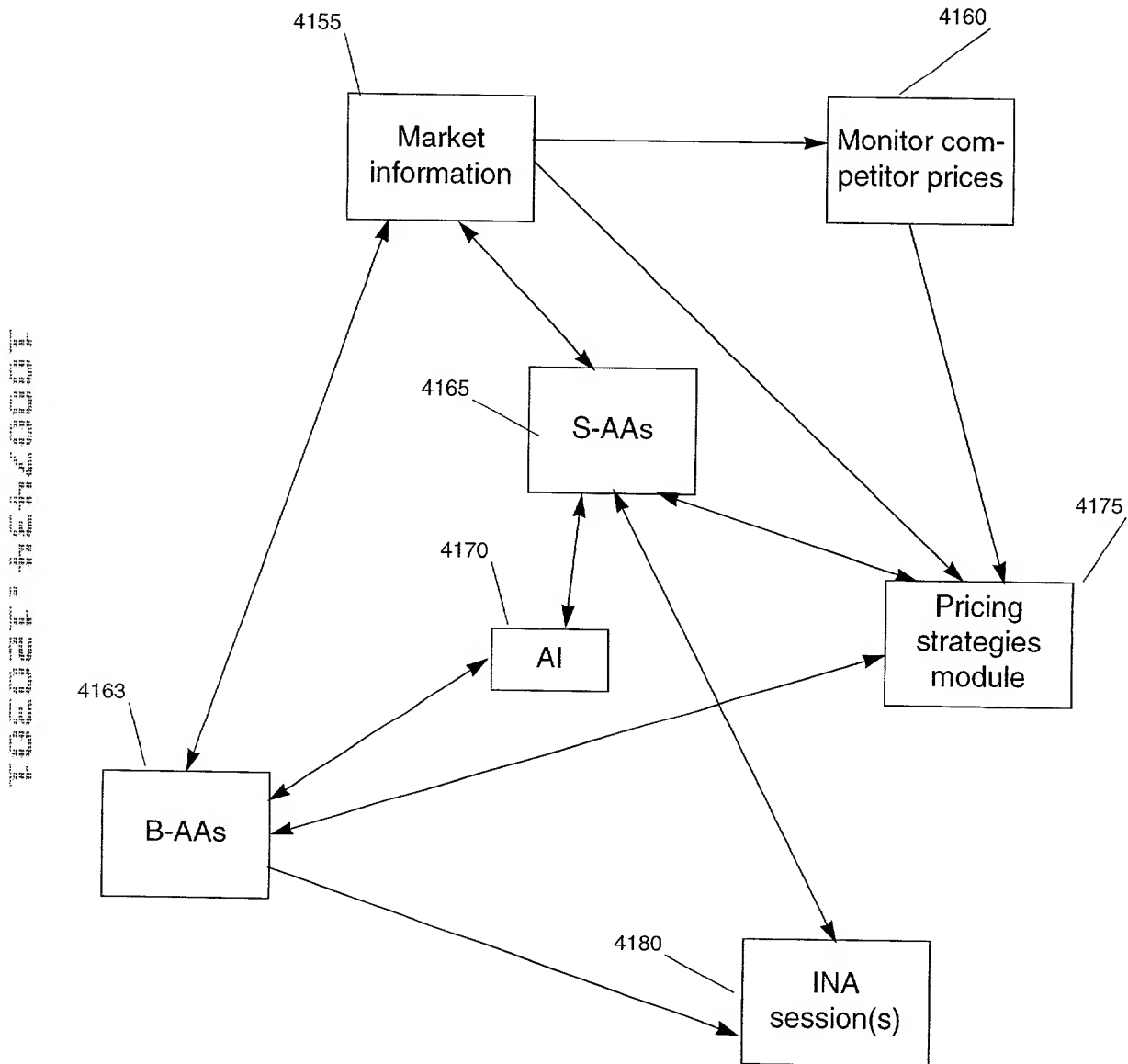
Fig. 45: Interaction Dynamics of INA"Personalities"

Yield Management	-Seller surpluses -Buyer shortages		-Seller shortages -Buyer surpluses
INA Stance	Optimistic		Pessimistic
INA Stance	Opportunistic (exploit)	neutral	Conservative (wait)
INA Stance	Aggressive (rush)	neutral	Unaggressive (delay)
Combination of INA Stance	Alternating between various "Attitudes" primarily to disguise INA Stance(s)		

Fig. 46: Neutral Broker Agency
C-INA Intermediation & Aggregation Applications

4505

Showcase 1

4510

Showcase 2

4515

Showcase 3

4520

Commercial Search Agent
(CSA)

4525

S-INA -1

S-INA -2

S-INA -3

S-INA -4

Specific Items
picked out for
aggregation

4530

Neutral C-INA
3rd-party
intermediary

4535

B-C-INA -
1

B-C-INA -
2

B-C-INA -
3

Possible
aggregating
of buyers

4540

Intelligent Transaction Agents (ITAs)
fulfill B-INA baskets at specified
time intervals

Fig. 47: C-INA Transaction Initiation Sources

Buyer side   Seller Side

4555   4575

Buyer   Sellers notify
request   buyers of
promotions   promotions

4557

Lead buyer broad-
casts seller promo-   4580
tions to buyers with
similar interests   Sellers provide
                                                     buyers initial
4560   invitations

Track customers'
interests and pro-   4585
vide promotions
                                                     Sellers push
4565   targeted ads

Track customers'
interests and pro-
vide promotions

4570

Proximity Marketing:
Customer (space/time)
Situation Stimulates
Contextual promotions

4590   Buyer INAs are
                 notified of seller
                 opportunities

Fig. 48: B-C-INA Aggregation

Showcase 1 — 4605
Showcase 2 — 4610
Showcase 3 — 4615
Promotions — 4620
Commercial Search Agent (CSA) (search requests) — 4625
b-ITAs — 4630
Lead b-c-INA Co-ordinates others — 4635
b-c-INA 1
b-c-INA 2
b-c-INA 3 — 4640

Seller triggers buyer co-operation by initiating negotiation process with several buyers

s-INA 1 — 4650
s-INA 2 — 4655
s-ITA 1 — 4660
s-ITA 2 — 4665
Winner determinations and allocations of items — 4670
Close transactions — 4675
End

Fig. 49: Automated Aggregation Category Structures

Combinatorial Auctions for multiple item bundles from various sellers — 4705

4740

Buyer Clubs
Voluntary discount clubs

4745

Buyer Alliances
Self organizing systems shifting with buyers and project changes

4710

pre-set bundles

open bundles

4720

S-INA -1

4750

Mass Pooling
Grouping similar interests

4725

pre-set bundles

open bundles

S-INA -2

4755

Clustering Agent Pools
Specialized interests grouped for specific projects

4730

pre-set bundles

open bundles

S-INA -3

4760

Cooperating Buyers
Self-selected groups cooperate on specific projects

4765

4770

Mass-customization
Buyers acquire unique items

Specialized Vertical Coalitions
Specialized buyer discounts for changing projects

Fig. 50: Aggregation I – Mass Pooling

4805

C-INA
B1

4810

C-INA
B2

4815

C-INA
B3

4820

C-INA
Bn

4825

Time sensitive order distribution

4830

Time T1   Time T2   Buyers items pool by time deadlines for wholesale discount   Time Tm-1   Time Tm

4835

Item sensitive bid distribution at various locations

4840

B-ITAs

4845

INA
S1

Item 1

4850

INA
S2

Item 2

4855

INA
S3

Item 3

4860

INA
Sp

Item p

4865

B-ITAs

4870

Final orders
are distributed to
buyers

4875

Close session once
quorum is met

Fig. 51: Aggregation II–Disintermediated Aggregation Method Prior To Negotiation

Fig. 52: Aggregation III –
Disintermediated Mass Customization

Fig. 53: Dynamic D-INA 's Double-agents: Arbitrage Applications

Phase I

5240

Seller INA1

5260

Dynamic INA (Buyer role/model)

5250

Negotiation sessions

Seller INA2

5255

5270

D-INA Switches Roles from buyer to seller

5265

Close transactions & receive (rights to) item from S-INA 2

Phase II

5275

Dynamic INA (Seller role/model)

S-INA

5278

5280

Need more contingencies to close transaction

Buyer INA chooses the D-INA item

Don't buy it

5285

Abandon transaction

5290

Buy it

B-ITA

5295

Drop-ship item to B-INA from first S-INA 2

5300

Close transaction

Fig. 54: Traditional Combinatorial Auction with Intermediary: Between Single Seller and Multiple Buyers

Single bid phase
Auction process

Buyers

Items: 1 - 5

5505 One Seller

5510 — 1
5515 — 2
5520 — 3
5525 — 4
5530 — 5

5535 Intermediary

5540 B-INA 1   5545 / 2 & 4 = X

5550 B-INA 2   5555 / 1, 2 & 3 = Y

5560 B-INA 3   5565 / 1, 3 & 4 = Z

5570 B-INA 4   5575 / 1 & 2 = R

5580 B-INA 5   5585 / 2, 3 & 5 = N

5590 B-INA 6   5595 / 3 = T
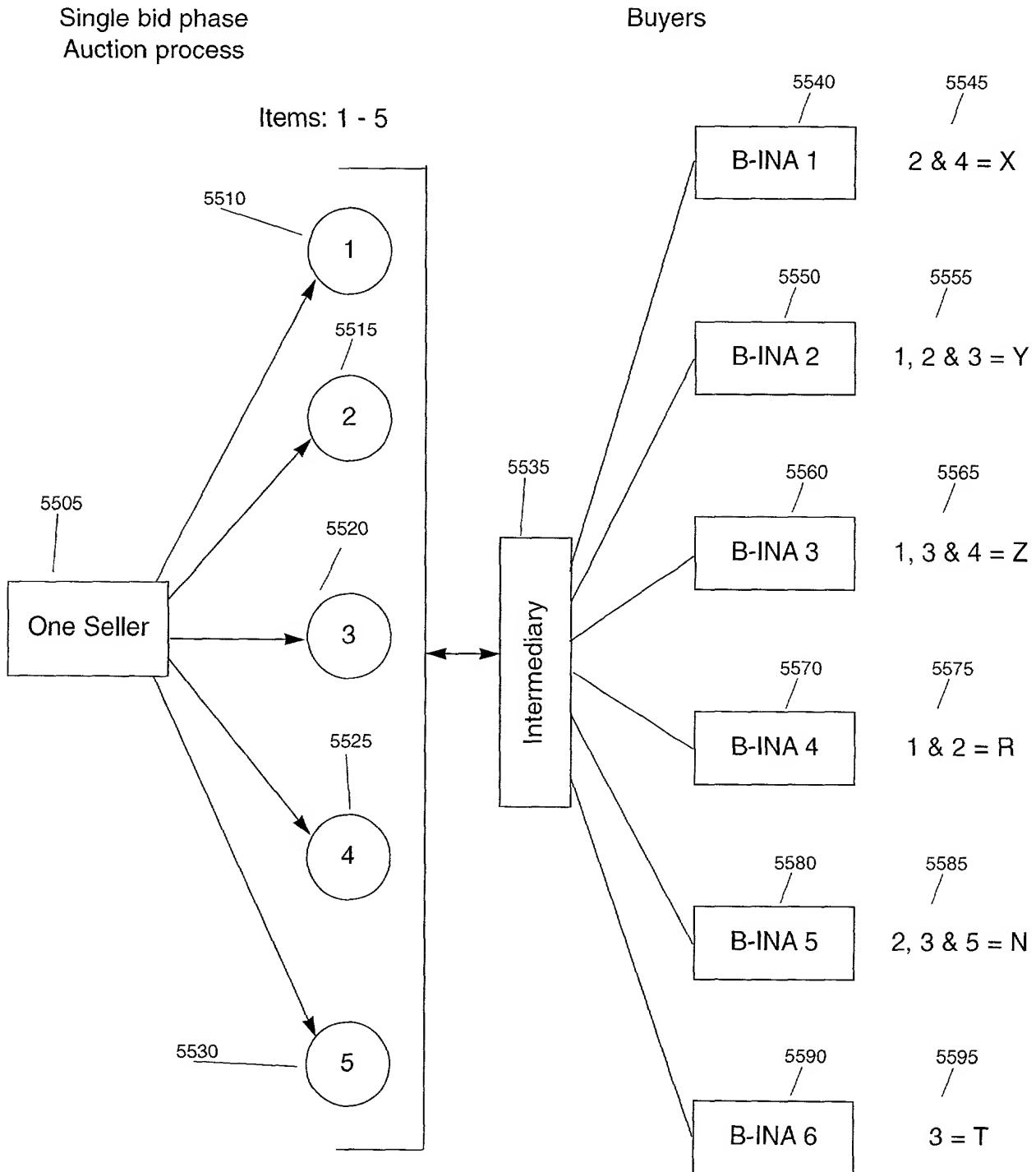
Fig. 55: INA Combinatorial [Double] Auction between Single Seller with Multiple Items and Multiple Buyers

5655

Buyer-INA B

5660

1

2

5670

Buyer-INA A

5675

Buyer-INA C

3

4

5680

Buyer-INA D

5685

A = 1 & 3
B = 1 & 2
C = 2 & 4
D = 2, 3 & 4

Fig. 56: Final Session
Winner Determination of Interactive Multi-lateral Auction

Fig. 57: Factor Filters

5805 — S-INA or B-INA

5810 — Evaluation of multiple bidders

5815 — Factor filters (pruning techniques)

5820 — Priority Preference specified

5830 —

Preset bundles

Specific bundles

5835 — **Progressive bundles**

5840 — **Quantity bundles**

Quality bundles

5850 — **Temporal Adaptive bundles**

5825 —

5860 — **Successor Contingent bundles**

5865 — **Priority Contingent bundles**

5845 — 5867

Best overall items are sought

5870 — Contingent on dynamic prices across product/service cycle

Threshold Factor-Specific item that is critical to bundle

5875 — Seek 1st choice, then 2nd choice, then 3rd choice, etc. when avail.

5880 — Seek first item & only then second item, etc.

Best value for less quality

5855 —

Item Preferences Seek preferred item in bundle — 5890

Increased chances of availability of multiple substitutable items — 5895

5883 —

5885 — Value fluctuation determines item priority in scope of time

5900 — **Need specific** (complementary) item(s) to make the **whole** bundle valuable to the buyers

5905 — Award 2+ quantity to 2+ buyers

Fig. 58: Disintermediated Multi-item Bidding From One Seller To Multiple Buyers

5955 B-AA 5960 B-AA 5965 B-AA 5970 B-AA

5975 B-INA 1 5980 B-INA 2 5985 B-INA 3 5990 B-INA 4

[Pre-negotiated protocols determine location of bids & winner determination rules]

5995 Mutually agreed rules of negotiation

[Bids on varying sets of items within established time phase]

6000 Seller INA- Multiple items

6005 Factor filters

6007 Buyers select unique sets of specific items

6010 Long-term relationship management

6015 Evaluation of bids by seller

6020 Short-term revenue maximization

6025 2 winners selected by more than price factors alone

6030 Winner 1

[Multiple items can be split between 2+ bidders]

6035 Winner 2

6040 Highest two overall bids selected

Second phase of bids

6045 Evaluation of second phase of bids

6050 Highest "overall" bid on multiple items

6055 Winner determination by S-INA

6057 ITAs

6060 End

Sheet 74 of 109

Fig. 59: Disintermediated Multi-item Bidding between Multiple Sellers and Single Buyer

6105 — **B-AA**

6110 — **B-INA**

6113 — CSA initial search for bundles of items

6115 — Mutually agreed rules of negotiation

6120 — **S-INA 1**

6125 — **S-INA 2**

6130 — **S-INA 3**

6135 — **S-INA 4**

Bidding by sellers for buyer's bundle — 6140

6155 — Pruning techniques of open bundles

[Limited bundles (increase efficiency)

6170 — Factor filters

6165 — Long-term relationship management[more than price alone]

6175 — Evaluation of bids by buyer

6180 — Short-term revenue maximization: highest price for each item

[Narrow to 2 sellers]

6185 — **S-INA 2**

6190 — **S-INA 4**

6200 — **End**

6205 — **B-ITA**

Prioritization of bids by B-INA — 6195

S-INA 2 — 6210

Winner determination

Fig. 60: Disintermediated Aggregation of Pre-Set Bundles between Multiple Sellers & Multiple Buyers

Fig. 61: Disintermediated Multi-item Bidding Between Multiple Sellers & Multiple Buyers

1 – 4:	Seller I	
5 – 8:	Seller II	
9 – 12:	Seller III	

Buyer Bidder A:	1, 5, 9
Buyer Bidder B:	2, 3, 4, 6, 7, 8
Buyer Bidder C:	3, 4, 7, 8, 12
Buyer Bidder D:	5, 6, 7, 9, 10, 11
Buyer Bidder E:	9, 10, 11, 12

Fig. 62A: Disintermediated Aggregation Of Multiple-item Bundles Bidding From Multiple Sellers To Multiple Buyers using C-INA 's

Phase I

6405 — S-AAs

6410 — B-AAs

[B-C-INA 's congregate at various locations at request of the lead B-C-INA . Pre-auction phase to set initial rule, once quorum of B-C-INA 's are congregated]

6415 6420 — Seller C-INA 1

6430 — B-C-INA 1: Seek set A

[Lead B-C-INA]

6435 6440 — Seller C-INA 2

6450 — B-C-INA 2: Seek set B

6445 — Cooperation of S-C-INA 's in order to calculate B-INA bid values

6455 6460 — Seller C-INA 3

6465 — B-C-INA 3: Seek set C

6470 6475 — Seller C-INA 4

6480 — Winning Bid(s) selected by seller calculations of high bid on multiple items

6485 — B-C-INA 4: Seek set D

6490 — Winning Bid(s) has priority for substitute items among winning seller(s)

Fig. 62B: Disintermediated Aggregation Of Multiple-item Bundles Bidding From Multiple Sellers To Multiple Buyers using C-INA 's (continued)

Phase I

Phase II

Phase III
Winning
seller

Final
phases
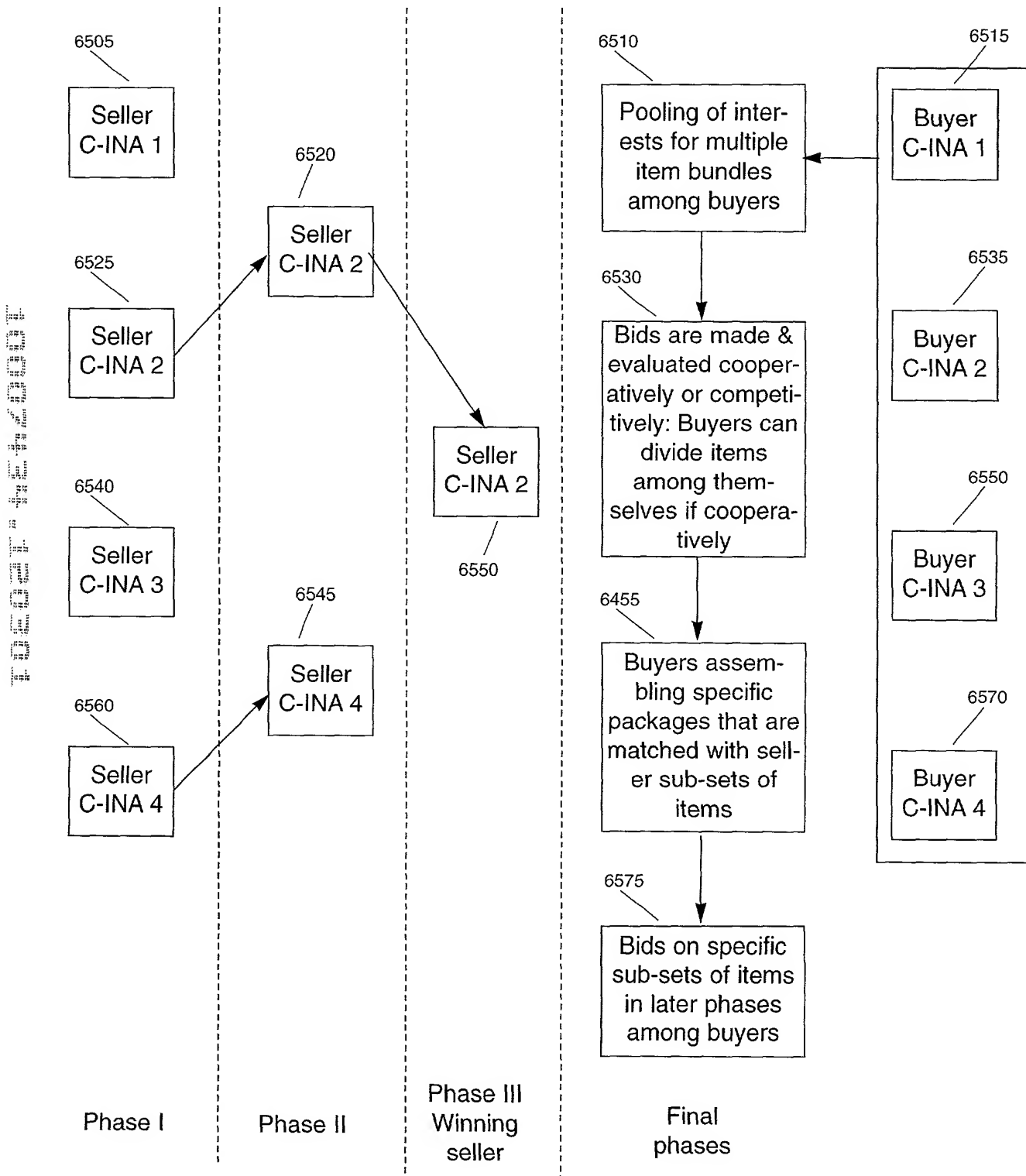
Fig. 63: Disintermediated Arbitrage Of Multi-item Bundles Between Multiple Sellers & Multiple Buyers using D-INA 's
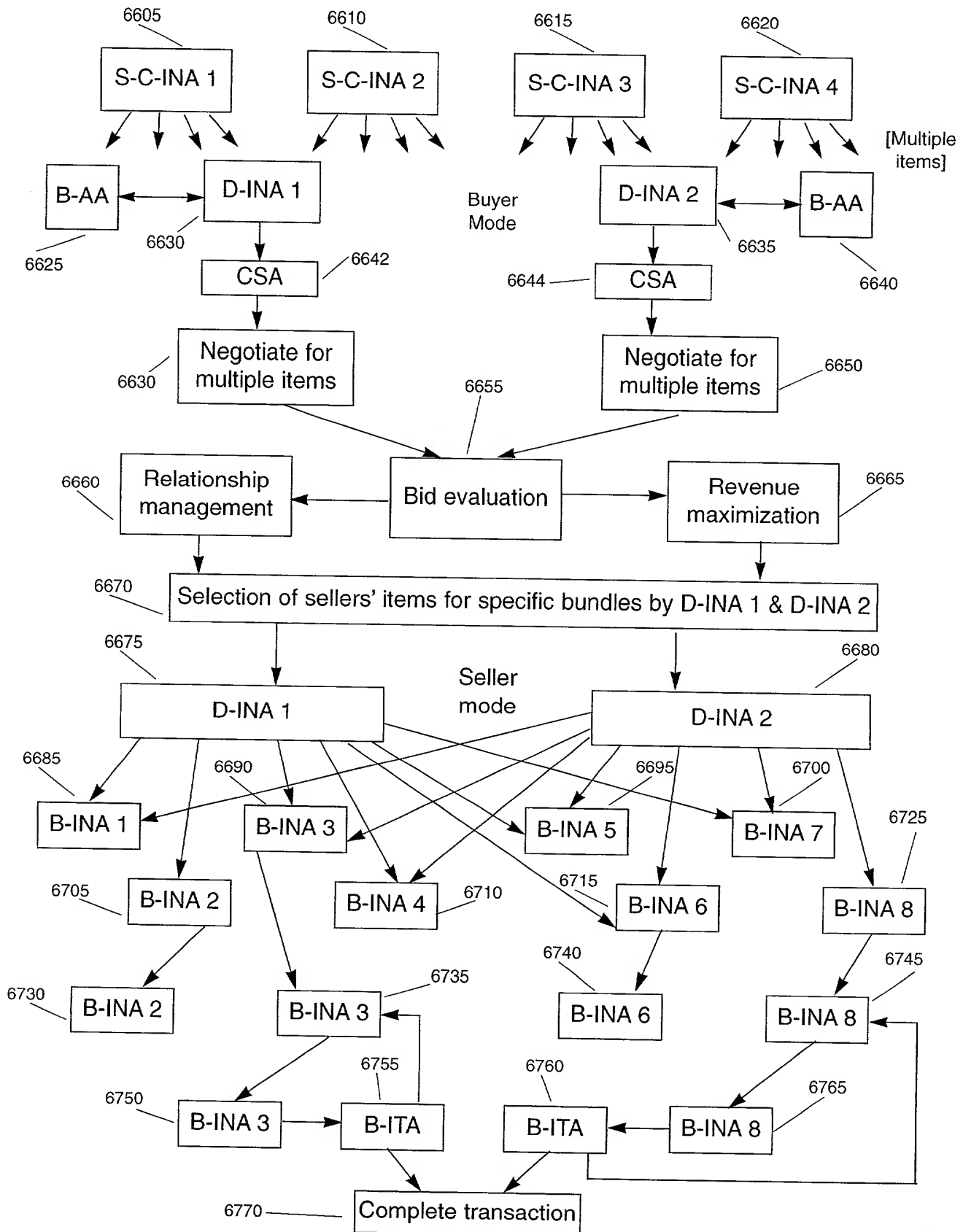
Fig. 64: Multifactorial Bidding Approaches
Sorting By Item Variables

Quality

Attribute – color, style, etc.

Quantity

Availability (now or later)

Delivery Time & Terms

Size

Dynamic Pricing Across product/service cycle

Brand/manufacturer

Configuration

Features

Additional options

Combinations of various features

Price

Payment Method

Payment Terms

Location

Fig. 65: Example of Multiple Feature Factors: Personal Computer Configurations

Manu.	CPU/ Mother board	Brand	OS	RAM	HDD	Modem & ISP contract.	DVD	Monitor	Price
Intel	500-ABC	IBM	MS	64	10	56 kbs	DVD	15 in	
Intel	500-ABC	Dell	MS	128	10	56 kbs	DVD	17 in	
AMD	500-XYZ	Gateway	MS	128	20	56/ISP	DVD	19 in	
AMD	800-XYZ	HP	MS	128	0	56/ISP	DVD	17 in	
AMD	800-ABC	IBM	MS	256	20	56/ISP	DVD	17 in	
AMD	800-ABC	Dell	Linux	256	20	128	DVD-RAM	17 in	
Intel	800-ABC	Gateway	Linux	256	30	128	DVD-RAM	17 in	
Intel	800-ABC	HP	Linux	256	30	128	DVD-RAM	17 in	
Intel	1.2-XYZ	IMB	Linux	256	30	128/ISP	DVD-RAM	17 in	
Intel	1.2XYZ	Dell	Linux	256	40	128/ISP	DVD-RAM	17 in	
Intel	1.2-ABC	Gateway	MS	256	40	128/ISP	DVD-RAM	19 in	
Intel	1.2-ABC	HP	MS	256	40	256	DVD-RAM	19 in	
AMD	1.2-ABC	IBM	MS	256	40	256	DVD-RAM	19 in	
AMD	1.2-ABC	Dell	MS	512	60	256	DVD	19 in	
AMD	1.2-XYZ	Gateway	MS	512	60	256/ISP	DVD	19 in	
AMD	1.8-XYZ	HP	MS	256	60	256/ISP	DVD	19 in	
AMD	1.8-XYZ	IBM	Linux	256	60	1.2mbs	DVD-RAM	21 in	
Intel	1.8-XYZ	Dell	Linux	256	80	1.2mbs	DVD-RAM	21 in	
Intel	1.8-XYZ	Gateway	Linux	512	80	1.2mbs	DVD-RAM	21 in	
Intel	2.4-ABC	HP	Linux	512	80	1.2/ISP	DVD-RAM	21 in	
Intel	2.4-ABC	Sony	MS	512	120	1.2/ISP	DVD	21 in	
AMD	2.4-ABC	Sony	MS	1.2	120	1.2/ISP	DVD	21 in	

Quantity – Discounts – 2-5, 5-9, 11-19, 21-29, 30-99, 100-499, 500-1999, etc.

Fig. 66: Examples of Categories of Multi-item Bundles

1. Computer Hardware configurations – RAM, HDD, CPU, monitor

2. Computer Hardware& Software

3. Computer Hardware & Services

4. Office equipment computer, printer, copier, fax, phone

5. Telephone equipment & services – local and long distance

6. Telecom capacity – rev. maximization across demand cycle

7. Electronic equipment – A/V combinations & software accessories

8. Photo equipment – camera, lenses, accessories, film, digital media

9. Airline tickets – time constraints to sell multiple seats to maximize revenue

10. Machines, machine parts, machine accessories

11. Cars/trucks & accessories

12. Wardrobe combinations, pants, shirts, coats

13. Real Estate – contiguous properties

14. Communications spectrum – contiguous properties

15. Gems

16. Railroad & trucking scheduling

17. Art, antiques, rugs, etc.

18. Housing combinations

19. Intellectual Property combinations

20. Pharmaceuticals

21. Chemicals

Fig. 67: S-ITA System Architecture

Market Data — 6800

S-INA — 6805

S-AA — 6810

Various Services
(at different
locations)

6815

S-ITA

(seller location)

Credit Status

Accountability

Insurance

Warranty

Computation
resources

Financing

6820

6830

Close Transaction
(Seller or Buyer location)

Fig. 68: S-ITA Operation

```
                    ┌─────────────────────┐
                    │       S-INA         │   6850
                    │ provisionally completes │
                    │    negotiation      │
                    └─────────────────────┘
                              │
                              ▼
                    ┌─────────────────────┐
                    │       S-INA         │   6855
                    │ requests S-ITA to clear │
                    │    transaction      │
                    └─────────────────────┘
                              │
                              ▼
                    ┌─────────────────────┐
                    │       S-ITA         │   6860
                    │ initiates review of transac- │
                    │ tion terms and item terms │
                    └─────────────────────┘
                              │
                              ▼
                    ┌─────────────────────┐
                    │ S-ITA  accesses financial data- │   6865
                    │ base to check buyer's credit │
                    └─────────────────────┘
                              │
                              ▼
  6885                ┌─────────────────────┐
    ┌──────────────┐   No │       S-ITA    │   6870
    │ Buyer's credit │◄────│ clears buyer's │
    │ not approved   │     │    credit?     │
    └──────────────┘      └─────────────────────┘
          │                      │ Yes
          ▼                      ▼
  6890 ┌──────────────┐    ┌─────────────────────┐
    │ Send back to  │    │   Aprove credit     │   6875
    │ negotiation   │    └─────────────────────┘
    │ session(s)    │             │
    └──────────────┘             ▼
                       ┌─────────────────────┐
                       │  Close transaction  │   6880
                       └─────────────────────┘
```

Fig. 69: S-ITA and B-ITA System Process
in Final Negotiation with One Seller

S-ITA
Seller Location

B-ITA
Buyer Location

Showcase — 6905

Pre-Negotiation Session(s) — 6910

CSA — 6915

S-AA — 6920

Seller INA — 6925

Buyer INA — 6930

Negotiation Session(s) — 6935

S-ITA — 6940

B-ITA — 6945

B-AA — 6950

Close Transaction — 6955

End Run — 6960
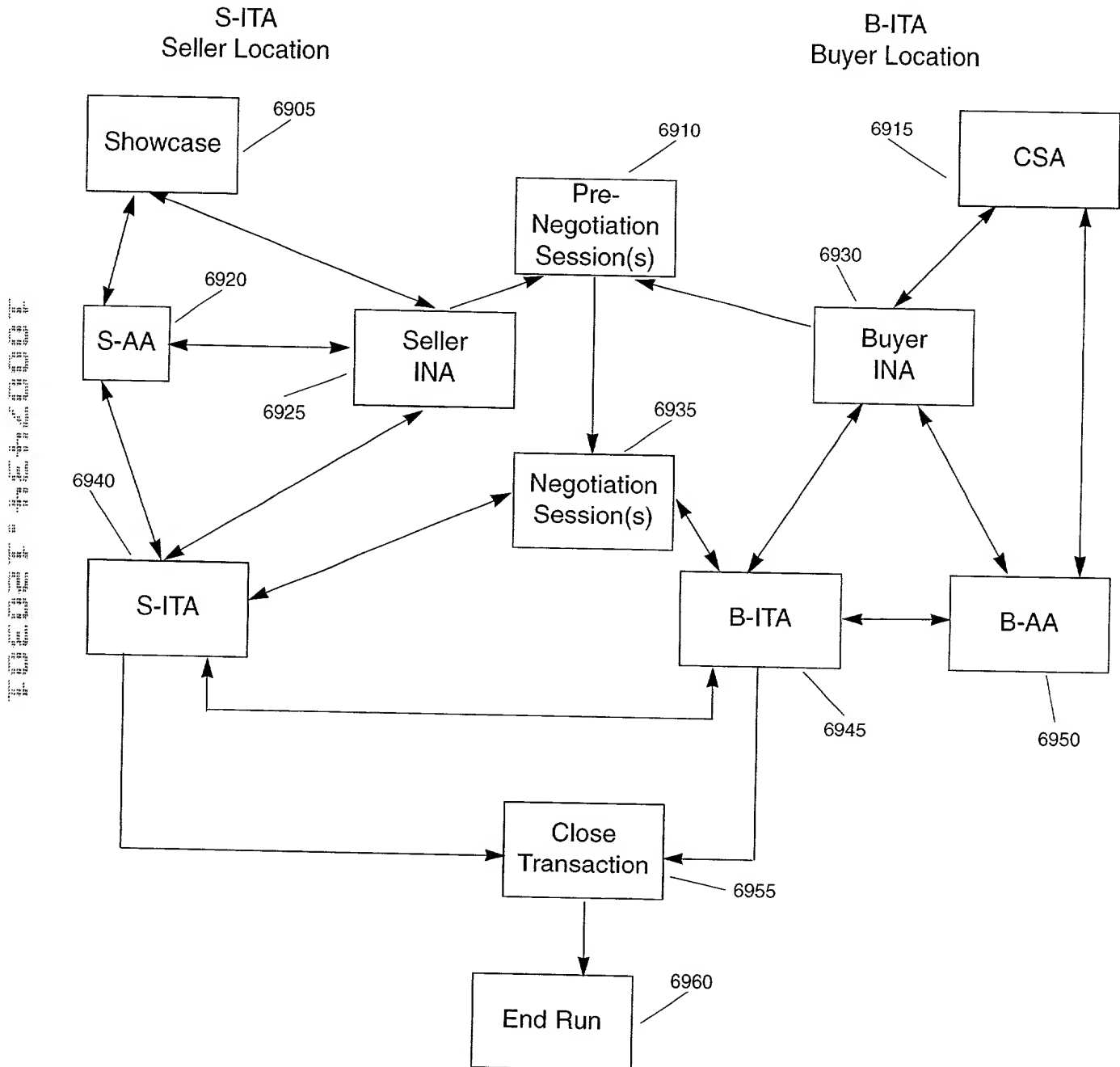
Fig. 70: ITA Service Categories: Buyer & Seller Roles

s – ITA Services	b – ITA Services	dual – ITA Services
Info.	Info.	Info.
AA functions	AA functions	
Superscore	Info about market, companies.,	
Accountability	economy, industry,	
Credit info.	products, etc.	
		Services
		Compliance – legal
Services	Services	Compliance – tax
Compliance – legal		RMO's
Compliance – tax	Promotion discounts	finance/credit
RMO's	Warranty	payment processing
finance/credit	Insurance	Fulfillment – shipping/tracking
payment processing		due diligence
Fulfillment – shipping/tracking		escrow
due diligence		report generator
escrow		post-sale feedback
report generator		
post-sale feedback		

Fig. 71: ITA Services

Accountability index → prior experience online
          → credit score & credit check

Financial credit module
  — matching buyer with appropriate lender

Contracting module

Compliance module
Legal compliance
Federal/state/international rules

Tax compliance

International customs compliance

Risk management options

Payment processing module
  — method of payments
  — billing/invoice
  — financial clearing and account crediting

Shipping/ delivery terms/tracking

Warranty Info & conditions

Insurance risks

Bookkeeping & accounting function

Due diligence

Escrow process

Report generator

Accelerated processing for high rated customer
Post sale feedback

Fig. 72: B-INA Micro-agents with Mobility

7105 — **B-INA Meta-agent**

7110 — **B-INA Micro-agent 1 launched for specific negotiation session at S-INA -1 location**

7115 — **B-INA Micro-agent 2 launched for specific negotiation session at S-INA -2 location**

7120 — **B-INA Micro-agent 3 launched for specific negotiation session at S-INA -3 location**

7125 — **Negotiation session at remote location**

7130 — **Negotiation session at remote location**

7135 — **Negotiation session at remote location**

7145 — **B-INA at buyer home or remote location**

7150 — **Winner determination at buyer home**

7155 — **Mutual agreement: S-INA3 & B-INA**

7160 — **Close sessions for S-INA1 & S-INA2**

7165 — **S-ITA3 complete deal?** no

yes

7170 — **End session**

Fig. 73: Genetic Algorithms Applied to Multi-Agent System

Start 7205

Search for optimal solution 7215

Generate set of candidate solutions based on available information 7225

Randomized mutation engine 7228

Create new generations of candidate solutions based on multi-factorial mutations 7235

Breed new generation of candidate solutions

Produce candidate variants using operators on surviving candidates 7240

Evaluate candidate solutions according to efficiency criteria 7245

Decide which candidate solutions will be kept or discarded by testing 7255

Discard 7250

Winner determination by using most updated criterion 7260

Solution results 7270

Market Data Inputs in distributed system 7210

Pattern matching 7220 → no → end 7223 / yes

Match candidate solutions with market data 7230

Sub-optimal solutions within specified constraints & trade-offs 7265

Ranking of each generation of candidate solutions for fitness 7280

Optimal solution relative to all candidates available 7275

Apply algorithm to agent analysis or activity 7285

End Run 7290

Fig. 74: Neural Networks Applied to Multi-Agent System

Fig. 75: Genetic Programming System Process

Data Inputs — 7505

7510 — Rule Based Learning

Regression Analysis — 7515

Induction Decision Trees — 7520

7525 — Pruning by matching what works

7530 — Organizing Models
- Scope
- Accuracy
- Missing values, Exceptions & Errors

7535 — Heuristic operational rules

7545 — Relearning

7550 — Scenarios

Forecasts — 7555

7560 — Yes %

No % — 7565

7570 — Apply to agent analysis or activity

7575 — End run

Fig. 76: Genetic Programming Learning Schemas

Predictors

Majority predictor

Average predictor

(Naive) Bayesian Inference

Decision Table

Machine Learning Methods

Decision Trees

Regression Methods

Goal Based Learning

Instance Based Learning

Rule Based Learning

Explanation Based Learning

Case Based Learning

Linear Regression

Locally Weighted Regression

Fig. 77: Evolutionary Computation Applications to Agents

7605

Evolutionary computation

7610
Activate GA — No →

7615
GP — No →

7620
NN

Yes   Yes   Yes

7625
CSA
(Goal-based reasoning)

7630
AA
(Case-based reasoning)
(Rule-based reasoning)

7635
INA
(Goal-based reasoning)
(Rule-based reasoning)
(Case-based reasoning)

7637
ITA
(Case-based reasoning)
(Goal-based reasoning)

-closer match
-more focused search
-information quality ranked
- faster search

7640

-fast analysis
-accurate analysis
-predictions in scenario format
- recommendation based on statistics

7645

Model Bidding Strategies for Buyer & sellers

7650

Optimize performance

7655

Fig. 78: AI Applied to Agency in a Distributed System

Agent requests AI application to solve problem at specific location — 7675

Agent accesses AI computation resources at specific location — 7680

Agent identifies optimal AI application by using filter that tests GA, GP & NN for specific use — 7685

7690 — Agent seeks new use of AI

Agent applies AI efficiently to specific use — 7695

Agent completes session — 7700

Fig. 79: Evolutionary Computation Architecture and AA/INA Applications

Fig. 80: Layered AI For Optimum Agent Mobility

[AAs & ITAs tend to be closer to home base because of need for maximum computing resources]

7860

Home base with substantial computing resources: AI, EC, GP, GA, NN, FL, etc.

7865

Most efficient AI use (minimum necessary)

7875

7870

Launch agent(s)

7880

Agent seeks reserve layers of AI

7885

Agent makes initial determination of minimum computation resources needed for expected activity based on initial (pre-negotiation) interaction

Parallel use of various AI for faster computation

Alternating uses of various AI methods for most effective computation

7890

7895

Agent enters into interactions or analysis using specified AI function levels at specified locations

7900

Agent discovers need for increased AI to perform increased functions

Agent completes function & terminates

Agent selects optimal methods of AI, GP, GA, NN, FL, EC, etc.

7897

7905

7910

AI filters

7915

Agent seeks out most effective use of AI functions

7920

7940

As agent interacts with increasing mobility (e.g. INAs) it needs a balance between less AI for fast/light mobility and more AI for sophistication

Increased calculations needed for increased number or complexity of agent activities (complex interactions or less time frames)

7930

less

more

Agent disables unnecessary code

Increased mobility with lighter load

7935

7945

Return to home base for more computing resources

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Fig. 81: Analytical Agent System Architecture
Buyer vs. seller viewpoints

Fig. 82: Kinds Of Data Analysis & Syntheses
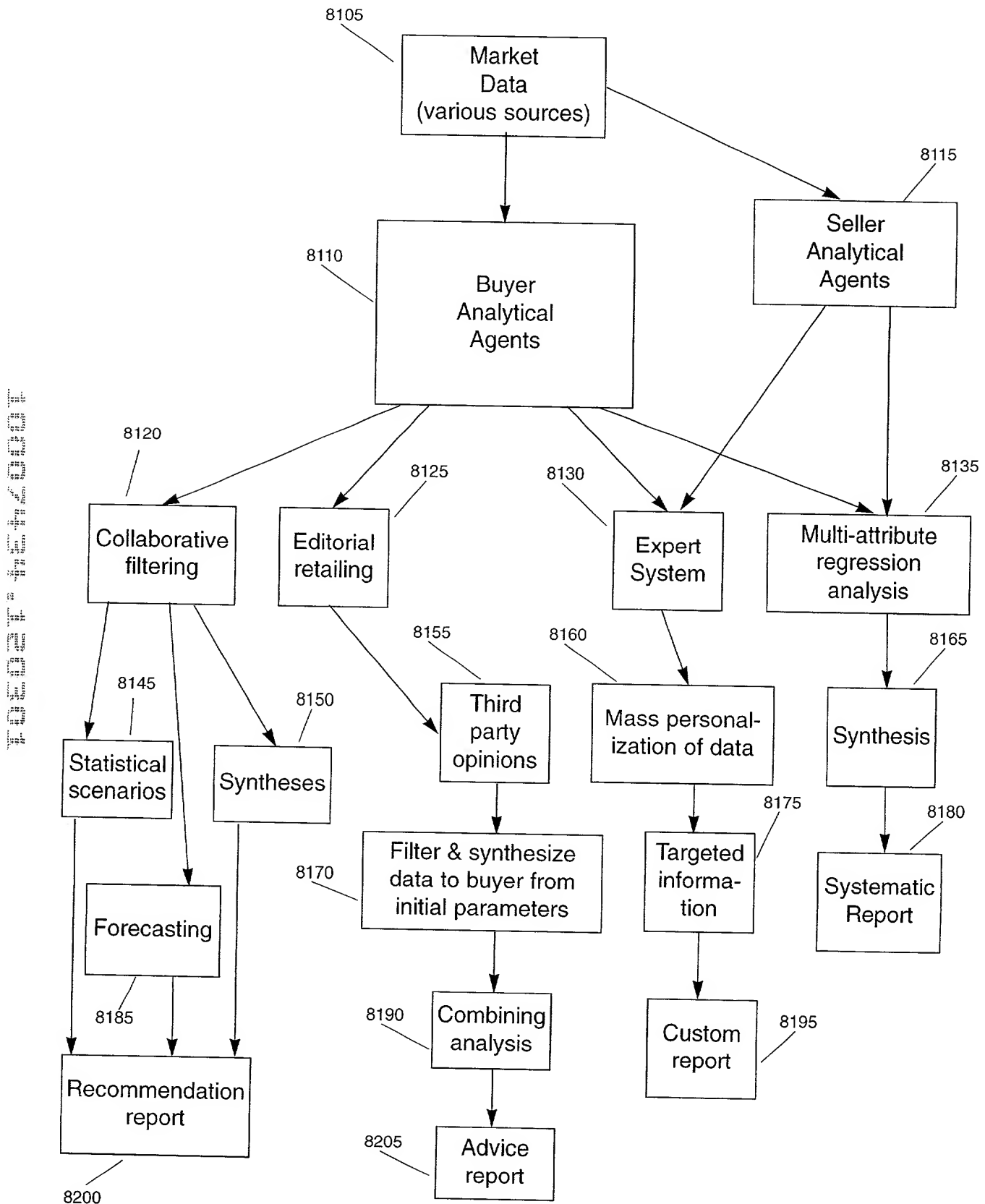
Fig. 83: Analytical Agent Data Flow Process

8255 — Market Data (various sources, translated into codes)

8260 — Analytical Agent

8265 — Services

Superscore Economic analysis Accountability Index Financial criteria index Insurance & financial risk management RMO's

8270

Promotions Aggregation Arbitrage

Market analysis Industry analysis Company analysis

Competition analysis Product analysis

8275
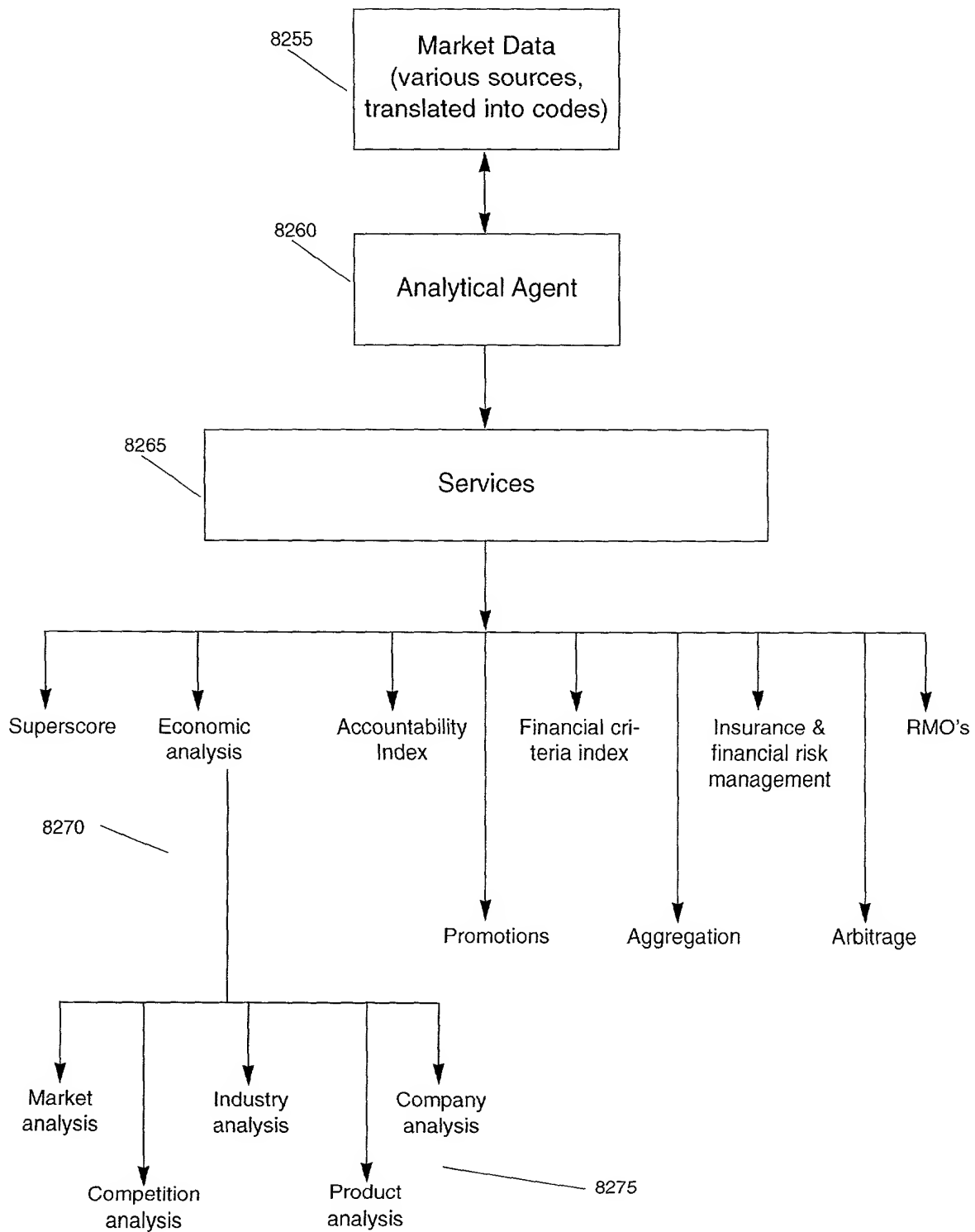
Fig. 84: Data Mining Approaches
CSA & AA interactions
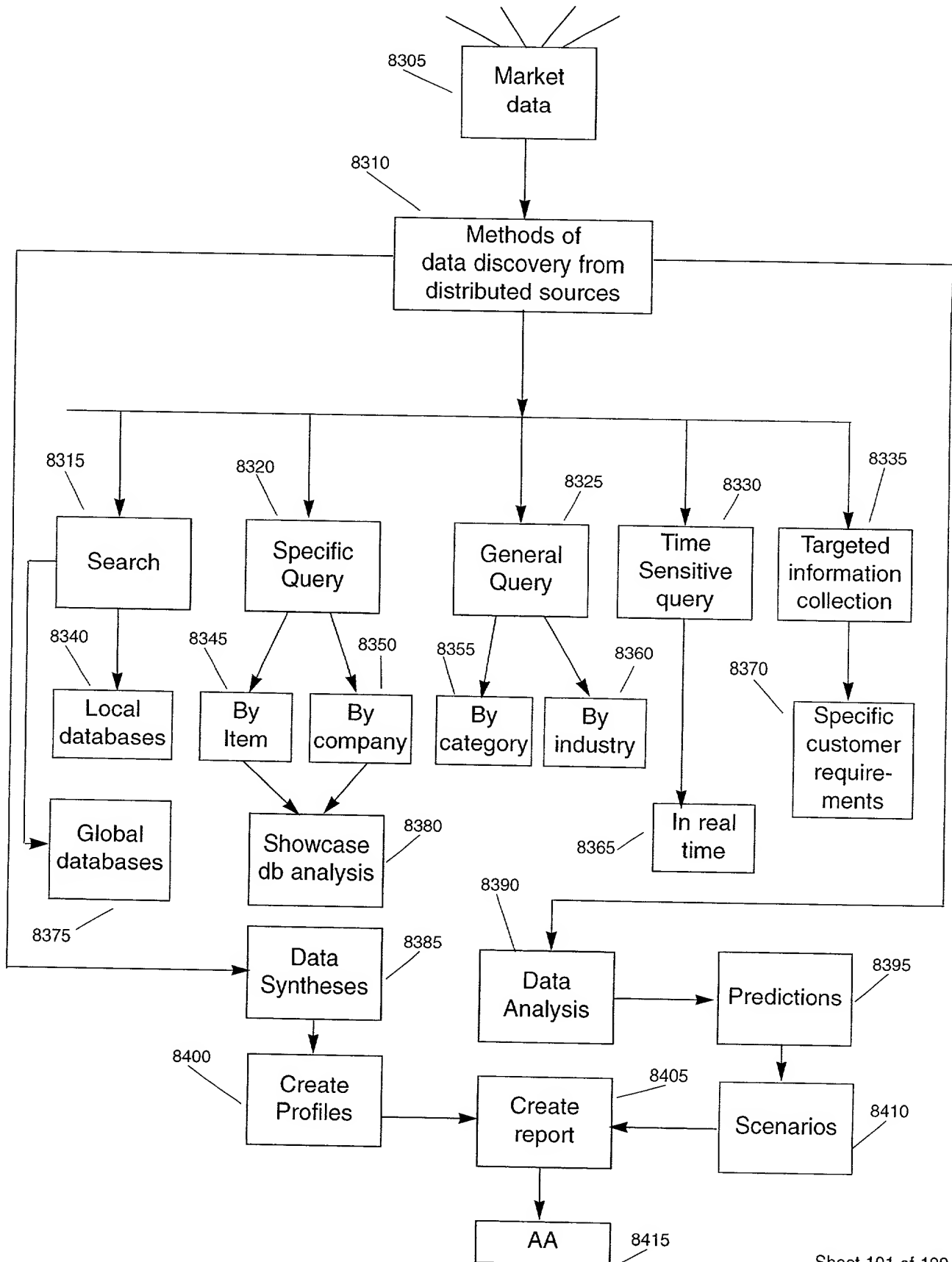
Fig. 85: Advanced Collaborative Filtering for Cross Marketing Recommendations

Showcase 8455

S-AA 8460

B-AA 8465

Request info on item(s) of interest to customer 8470

Analyze similar customers purchasing similar items at multiple locations 8475

CSA 8480

B-Inter-agent 8485

Filtration process based on:

Item type	Popularity	Region	Quality	Services	Bundles	Quantity	Price range

8490

B-AA 8495

Analysis: Statistically rank new items of interest to customers with similar interests based on initial item 8500

Push recommended items to customer as promotions 8505

Recommend other items associated with purchase of current item 8510

New purchase data is added to database

Present customer with list of recommended items 8515

Customer acquires recommended item(s) 8525

Fig. 86: B-AA Operations With Mobility

8550 — B-INA (or B-ITA) requests analysis from B-AA

8555 — B-AA activates analysis at specific location

8560 — B-AA moves to remote location to collect data (or import data)

8565 — B-AA moves to multiple remote locations to collect data

8570 — B-AA performs analysis on data

8575 — B-AA organizes analysis and issues report

8580 — B-AA performs synthesis on data by combining data sets

8585 — B-AA organizes data syntheses and issues a report

8590 — B-AA applies analysis or synthesis to B-INA (or B-ITA) function at specific location by exporting reports

8600 — B-AA completes session

Fig. 87: Super-Score System: Negotiated Variables

1. Object Description – need reference to adaptable tables
2. Seller Description
3. Buyer Information
4. Buyer Credit Data
5. Finance opportunities – credit
6. Seller Promotions
7. Risk Management Options
8. Market Data on Multiple Sellers & Buyers

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

9. Industry Code
10. Unit Quantity
11. Unit Quality
12. Time to deliver
13. Bundling code — discounts
14. After Sales rating code
15. Quantity Code – each # signifies group category 1-100, 100-1000 etc.
16. Location of Negotiations

| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |

Fig. 88: Economic/Market Analysis Variables

1. Industry Code
2. Industry Analysis
3. Product Analysis
4. Need Index of average prices for each main sector – trends, changes
5. Prices relative to market averages
6. Intra-company analysis of products/services – scope, growth rate change, etc. analysis of data
7. Probability scenarios of industry company
8. Broad Market Analysis (as service)
9. Economic indicators

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
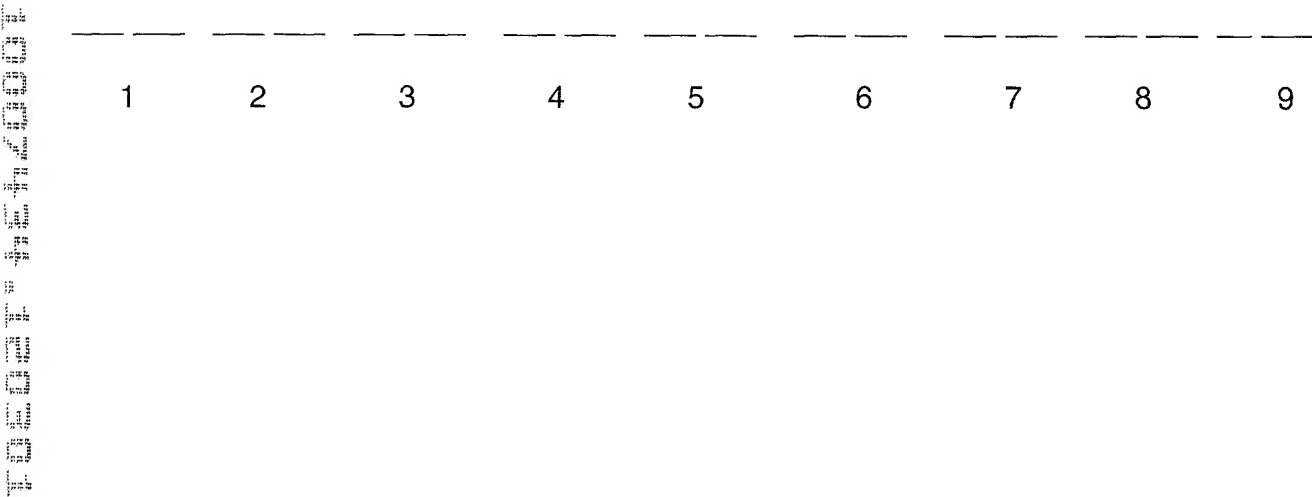
Fig. 89: Accountability Index System Variables

1. Bidding History
   a. % bid
   b. # of bids
   c. % of bids won
   d. # of bids won
2. Follow Up History
   a. # & re-negs
   b. # & returns
3. Credit History
   a. credit limit
   b. credit growth
4. Risk Factors
   a. fast changes outside
5. Flexibility ratio
   a. customer/seller as less rigid to accept deal
6. Tracking Pattern of Negotiation
   a. figuring into accountability index
7. Transaction Prior Experiences
   a. bidding history
   b. success
   c. problems
8. Follow through ratio
9. Accountability Index
10. Specify factors
11. Credit factors
    a. debt ratio to net worth
    b. paying on time
    c. use up to limits, floating debt
    d. credit limits
    e. # of accounts
    f. risk of default
12. Identify/authenticate agent/entity
13. Responsiveness to requests
    a. In time factor

1   2   3   4   5   6   7   8

9   10   11   12   13

Fig. 90: Financial Criteria Index System

30+ Digit Code

1. Net Worth
2. Income
3. Cash Flow
4. Level of Debt to net worth
5. Public records
6. Value of assets
7. How much credit limit is used
8. How often up to (or over) limit
9. Financial Criteria factors
10. Length of credit accounts
11. Credit Limit
12. Unsecured vs. Secured debt
13. Derogatory Credit – over limit past due
14. Number of moves
15. Frequency of Place
16. Final Index Number to put in Super Score

— — — — — — — — — — — — — — — —

    1   2   3   4   5   6   7   8

— — — — — — — — — — — — — — — —

    9   10   11   12   13   14   15   16

Fig. 91: Insurance Risk Factors

1. Use of Stats to establish rates
2. Kinds of losses specified
3. Claim-Adjustment Procedures
4. Claims Procedures
5. Errors
6. Omissions
7. Fraud
8. Accident
9. Premium Accounts
10. Limits/amounts of insurance
11. Full vs. Partial losses
12. Entity past record of claims
13. Costs of losses
14. Risks of specific events
15. Risk of limited loss
16. Risk of total loss

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |

Fig. 92: List Of Services

1. ITA (Transactions)
   a. Actual banking services
   b. Aggregation (for better deals)
   c. Insurance
   d. Warranties
   e. Payment Processing
   f. Tax Collection & Payments
   g. Escrow
   h. Due Diligence
   i. Legal, tax, customs
   j. Compliance
   k. Accounting
   l. Shipping/delivery
   m. Delivery tracking
   n. Post-sale reporting

2. AA (Analysis)
   a. Economic analysis
   b. Market/industry analysis
   c. Company, product & service analysis
   d. Financial & credit analysis
   e. Accountability Indices
   f. Superscore

3. Risk Management Options
   a. Penalties for sellers not fulfilling by specified time
   b. Risk priorities – order of preferred risks
   c. Arbitrage penalties
   d. Option swaps (exchanging opposing kinds of risks)
   e. Dynamic pricing of risks based on peak/low risks environment
   f. MTO Penalties
   g. JIT Penalties
   h. Risk Sharing

4. Promotions (CSA)
   a. Discounts
   b. Aggregation (group discounts)
   c. Promotional guarantees
   d. Promise to provide item by specific time
   e. Quality increase offer
   f. Bundling products & services

5. Insurance Risk Management
   a. Liability (product/service, business, individual)
   b. Dynamic pricing based on peak risks
   c. E&O Fraud risks
   d. Risk of event loss
   e. Re-insurance – Insurance risk sharing
   f. Accident risks
   g. Degrees of losses

6. Financial Risk Management
   a. Credit analysis /buyer, seller
   b. Secured debt – kinds of assets
   c. Unsecured debt
   d. Structured fin.-by asset category (securitization of assets/debt)
   e. Packaging debt
   f. Packaging Ins. & Fin. Opportunities

7. Additional Services
   a. Bundling products &/or services
   b. Customized orders
   c. Mass-customization
   d. Just-in-time items
   e. Aggregation of bundles
   f. Arbitrage of items & bundles
   g. Computation resources
   h. Bandwidth resources